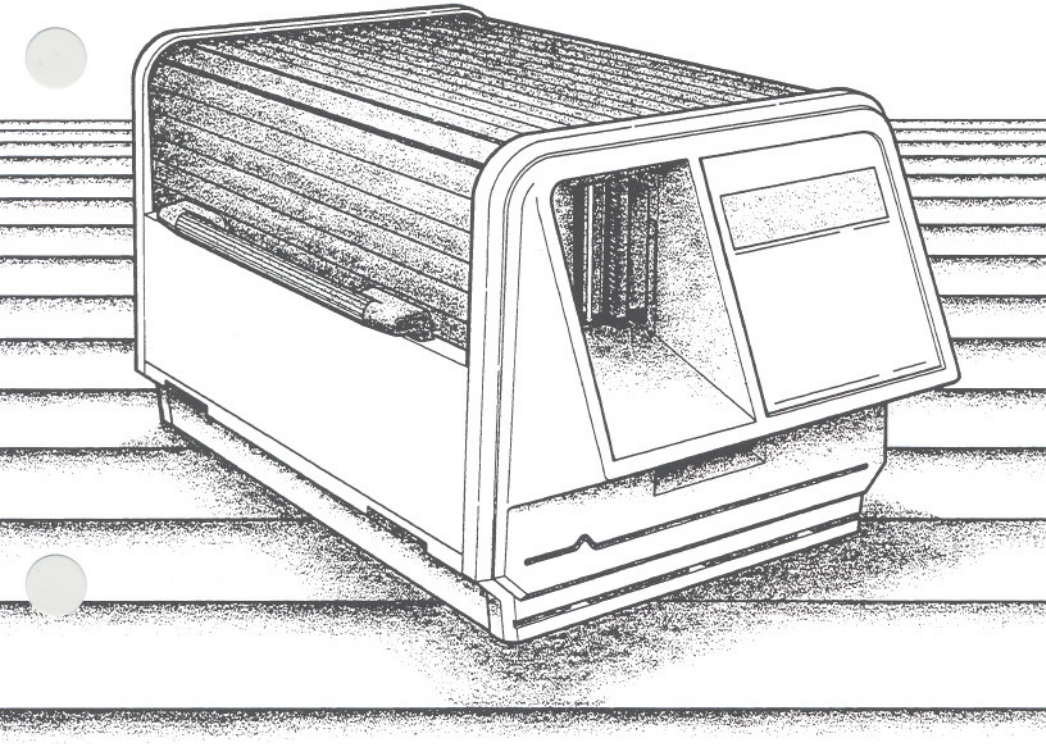
Monarch
Marking Systems

Monarch 9401®/ 9402® Thermal Printers

System Administrator's Guide



TC9401SA Rev. E 8/95

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WARNING

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CANADIAN D.O.C. WARNING

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Réglement sur le brouillage radioélectrique édicte par le ministère des Communications du Canada.

WARNING

The power cord is intended to serve as the disconnect device. The socket-outlet shall be near the equipment and shall be easily accessible.

WARNUG

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1. Introduction

Be sure you understand the information in the *Operator's Handbook* before you read this manual.

Read this manual if you

- oversee the generation of labels or tags.
- design labels or tags.
- decide what to print on labels or tags.

Use this manual to design and print your own custom labels or tags on a 9401® or 9402® printer.

About this Manual

This manual explains how to

- design a label or tag.
- convert your design to a *format*.
- build format files on a computer.
- prepare the printer to receive information for printing.
- send data to the printer from a computer.
- set up printing procedures for printer operators.
- run printer diagnostics.

You need a computer for many of the tasks in this manual. You need not be a programmer, but you should know commands used by your computer's operating system. On MS-DOS™ systems, for example, you should be familiar with the COPY and MODE commands.

Equipment Requirements

If you plan to create your own label or tag designs, you need

- 9401 or 9402 printer
- MS-DOS computer or mainframe terminal
- 9-pin RS-232 interface cable.

9401 standard features	**9402 standard features**
5-key keypad for printer control	21-key keypad for manual data entry
2" x 6" print image for industrial size supplies	2" x 4" print image for retail size supplies
3 standard formats	3 standard formats
Label backing take-up reel	16 sample formats
Ribbon provision	Ribbon provision on some models

What is a Format?

A *format* is a set of dimensions, parameters, and instructions defining where to place information on labels or tags. Labels and tags are also called *supplies*.

The goal in designing a format is to map out your label or tag. Later you will insert actual information, like a bar code, price, or serial number. The format simply defines where to put this information, and how to print it.

Each "slot" that will contain an item of information (bar code, price, etc.) is called a *field*.

The actual information that fills this framework is called *batch data*.

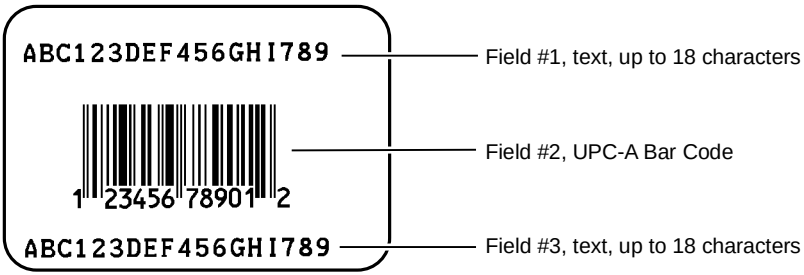
Standard Formats

The printer comes with three standard formats.

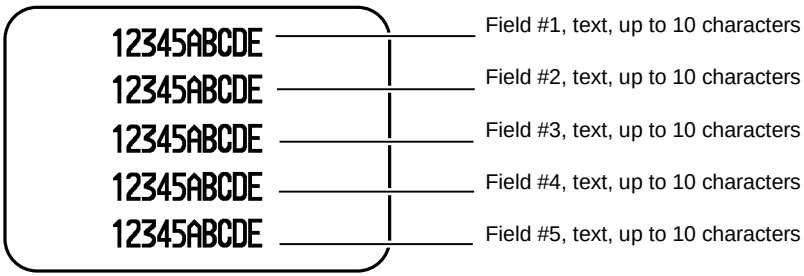
Format Name	Format Number
FMT-1	96
FMT-2	97
FMT-3	98

NOTE: Other formats may be available. See "Checking for Optional Formats," later in this chapter to find out if you have optional formats.

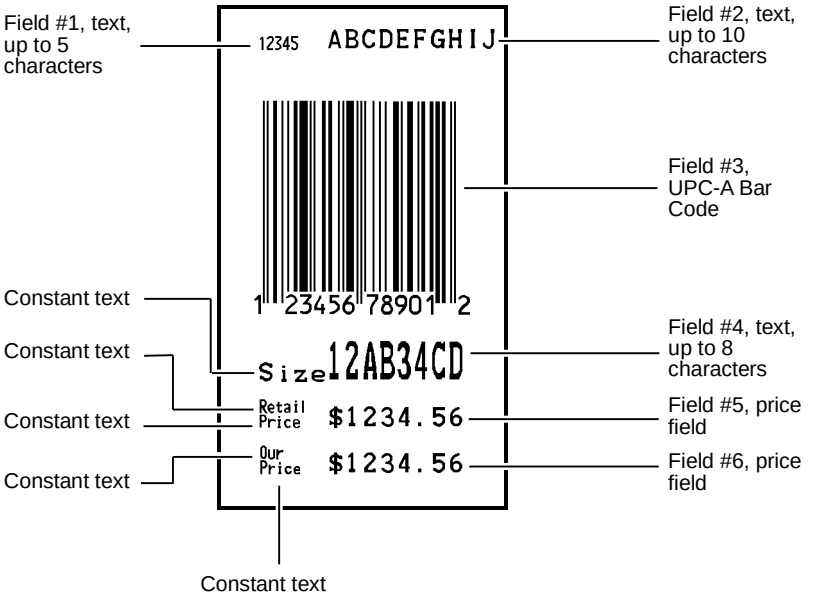
Format #1 Size: English: 1-3/8" x 2"
Metric: 35mm x 50.8mm
Dots: 264 x 384 dots


ABC123DEF456GHI789
1 23456 78901 2
ABC123DEF456GHI789
Field #1, text, up to 18 characters
Field #2, UPC-A Bar Code
Field #3, text, up to 18 characters

Format #2 Size: English: 1-3/8" x 2"
Metric: 35mm x 50.8mm
Dots: 264 x 384 dots


12345ABCDE
12345ABCDE
12345ABCDE
12345ABCDE
12345ABCDE
Field #1, text, up to 10 characters
Field #2, text, up to 10 characters
Field #3, text, up to 10 characters
Field #4, text, up to 10 characters
Field #5, text, up to 10 characters

Format #3 Size: English: 2-3/4" x 1-1/2"
Metric: 67mm x 38mm
Dots: 528x 288 dots



How to Use this Manual

The purpose of this manual is to help you create a system for printing tags and labels on your 9401 or 9402 printer. Complete these steps to print supplies.

1. Select a format that fits your supply size. You can use supplies equal to or larger than the format size. Select formats from the following.
   - Standard formats FMT-1, FMT-2, or FMT-3, shown earlier.
   - Optional formats numbered 54 to 69 or 70 to 85 (see the steps on the next page to check for these formats).
   - Design your own formats (read Chapters 2, 3, and 4).
2. Enter batch data to fill in the format. There are three ways to enter batch data.
   - Use the 21-key keypad on the printer, if available (see your *Operator's Handbook*).
   - Use an optional Monarch® computer keyboard, if available (see your *Operator's Handbook*).
   - Download data from a computer (read Chapters 5 and 6).
3. Print supplies. Read Chapters 7 and 8.

Refer to the following chapters for other administrative functions.

Chapter	Description
2	Designing formats
3	Applying optional formatting rules
4	Defining and using check digits
5	Recording batch information
6	Entering format and batch data on a computer
7	Configuring the printer for downloading
8	Downloading formats and batches, printing supplies
9	Editing and reviewing formats
10	Establishing operator procedures
11	Online reference information
12	Reference charts for formats and character codes
13	Printer diagnostics

Checking for Optional Formats

If you are not sure whether you have optional formats, here is how to check.

1. Turn the printer **On** and press Esc to go to the Main Menu.
2. Press → until you see Batch Entry.
3. Press Enter .
4. Press ← or → until you see Permanent.
5. Press Enter .

   If you see

   ```
   No formats!
   Press Enter._
   ```

   then your printer is not equipped with optional formats. Press Enter to continue.

6. If you see

Select Format
Format Name ##

Press ← or → to scroll through the formats.

9402 printers have one of the following sets of 16 formats.

Set A		**Set B**	
Name	**Format Number**	**Name**	**Format Number**
FMT 54	54	FMT 70	70
FMT 55	55	FMT 71	71
FMT 56	56	FMT 72	72
FMT 57	57	FMT 73	73
FMT 58	58	FMT 74	74
FMT 59	59	FMT 75	75
FMT 60	60	FMT 76	76
FMT 61	61	FMT 77	77
FMT 62	62	FMT 78	78
FMT 63	63	FMT 79	79
FMT 64	64	FMT 80	80
FMT 65	65	FMT 81	81
FMT 66	66	FMT 82	82
FMT 67	67	FMT 83	83
FMT 68	68	FMT 84	84
FMT 69	69	FMT 85	85

These formats are illustrated in Appendix A.

7. Press and hold Esc to return to the Main menu.

Setting the Administrator Password

One of the first things the administrator should do is establish a password for administrative and diagnostic functions.

See the section, "Changing Passwords" in Chapter 13 to set the administrator password.

2. Designing a Format

If none of the standard formats fits your needs, you can design your own formats.

Format Design Tools

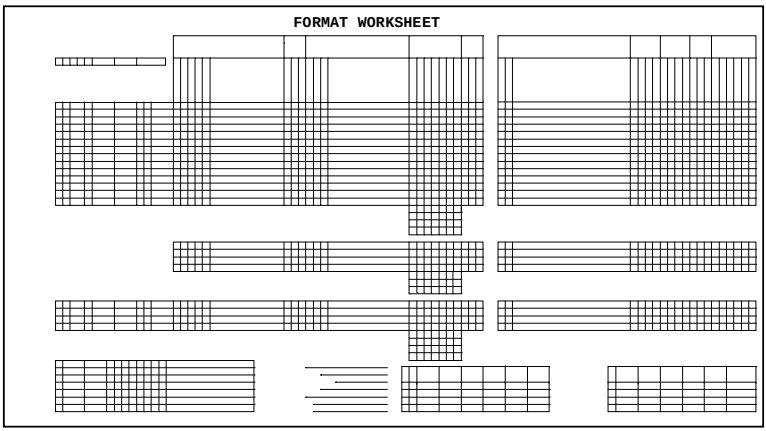
A Format Worksheet and Supply Layout Grids are supplied in Appendix D. You will need them to design formats.

Make copies of the Format Worksheet and Supply Layout Grid. Save the originals and work with the copies.

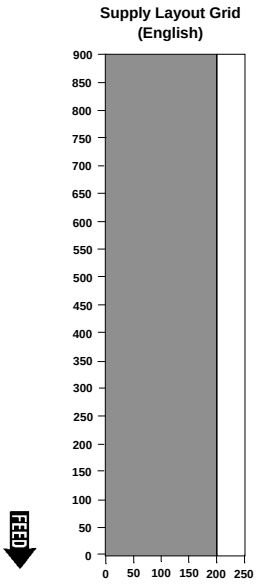
Make sure you have some paper for rough sketches.

Format Worksheet

This worksheet will serve as a permanent record of your format parameters. As you create formats, write parameter values on the Format Worksheet. Later, you will use the Format Worksheet when entering format data into a computer.



Supply Layout Grids



You should have three Supply Layout Grids.

- English
- Metric
- Dots

The English grid, shown to the right, is measured in 1/100 inches.

The Metric grid is measured in 1/10 mm.

This printer uses dots to print images on a supply. The printhead has 192 dots per inch. Use the Dot Layout Grid if you prefer to design formats according to dot measurement.

Decide whether you want to design formats using English, Metric, or dot measurement. Use the corresponding Supply Layout Grid to determine supply dimensions and measure field locations.

Steps to Designing a Format

To design your own custom format

1. Determine format contents.
2. Define the format header.
3. Define text and bar code fields.
4. Define lines and boxes, if any.
5. Apply field options, if desired.

Determining Format Contents

Decide what you want to print on the supply. Any information should be in the form of text, bar codes, lines, boxes, or graphics.

Each piece of information is either a *field* or an *overlay*. Here are the field types and how each type might be used.

Fields

There are three types of fields: text, non-printable text, and bar codes.

Text Fields

Text fields contain alphabetical, symbol, or numerical characters. Here are some uses.

- Company name or department number
- Serial number
- Shipping address
- Price.

You can define up to 14 fields in a format. The total can be any combination of text, non-printable text, or bar code fields.

Non-Printable Text Fields

Use non-printable text fields if you want the operator to enter data, but you do not want to print it as entered. For example, you can enter city, state, and zip code in three non-printable fields, then merge them to print as one field.

Bar Code Fields

Select from 7 bar codes: UPC-A, UPC-E, I 2 of 5, Code 39, EAN-8, EAN-13, Code 128. Here are some uses.

- Item or serial number
- Merge information from multiple text fields.

Overlays

Constant text, lines, boxes, and graphics are *overlays*.

Constant Text Overlays

A constant text overlay is a set of fixed characters that prints on all supplies using that format. You cannot change the characters in the overlay.

> Overlays do not count in field numbering from 1 to 14. Field Options do not apply to overlays.

Lines and Boxes

Use lines or boxes to highlight or separate items. For example,

- border the supply with a box
- mark out the regular price on a sale tag
- highlight an item with a box or line.

Graphics

You can print graphics such as logos or symbols. This manual does not discuss graphics. Contact Technical Support if you want to use graphic images in your formats.

Field Options

You can apply options to text, non-printable text, and bar code fields. For example, you can format a field as a price. You might also create a set of descriptive prompts to ask the operator for the exact information for each field. Here are some examples.

Fixed Characters

Fixed data prints automatically on every tag or supply, without any input from the operator. You can specify fixed characters for any text or bar code field.

Price Fields

You can design a price field so the printer generates the monetary symbols. The operator only needs to enter numbers.

Sub-Fields

You can copy part of a field to a new location. The new location is called a sub-field. For example, you can extract part of the data in a bar code, such as a price, and display it in text form in a sub-field.

Merged Fields

Merging combines information from up to four fields into one field. You can merge any combination of text, non-printable text, or bar code fields.

Operator Prompts

The printer normally prompts the operator for batch information by field number. For example, the printer prompts "Field 1:" when it is ready to accept data for field 1. You can substitute a more descriptive prompt by applying a field option. For example, you can define a prompt that says "Enter Price:" if field 1 is a price field.

Incrementing/Decrementing Fields

You can specify numeric fields to increase or decrease in value as you print. This applies to numeric data only. For example, you could print a batch of labels with serial numbers that increase with each label.

Date/Time Fields

You can print the date or time on your tag or label. The operator only needs to enter the appropriate numbers. The printer adds the punctuation automatically.

Check Digits

You can have the printer *generate* or *verify* check digits for text or bar code fields. See Chapter 4, "Using Check Digits."

See Chapter 3, "Applying Field Options," for details on these and other options.

The Print Area

If you use supplies larger than 2 inches x 4 inches, your printer may not print an area that covers the entire supply. Check the table below to determine the maximum print area.

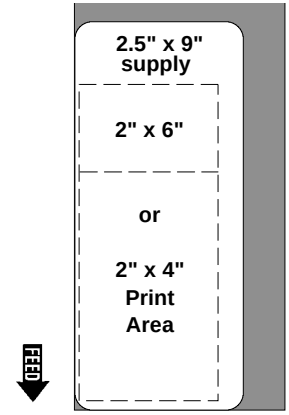
Unit of Measure	Supply Size		Maximum Print Area	
	Maximum	**Minimum**	**Model 9401**	**Model 9402**
Metric	63.5mm x 228.6mm	19.05mm x 19.05mm	50.8mm x 152.4mm	50.8mm x 101.6mm
English	2.5" x 9"	0.75" x 0.75"	2" x 6"	2" x 4"
Dots	480 x 1728	144 x 144	384 x1152	384 x 768

This table is based on standard configurations. Some 9402 printers may have optional memory installed, allowing for the larger print image.

The print area is in the lower left region of the supply. The bottom is the edge that exits the printer first.

The actual print area begins approximately 0.05 inches from the bottom and 0.075 inches from the left edge of the supply.

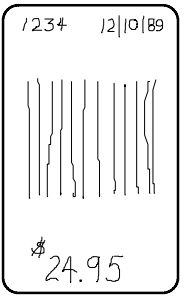
If you want to shift printing to a different part of the supply, see "Setting Supply Options" in your *Operator's Handbook.*



NOTE: If you have a format that covers the entire six inches of the print area length, the printed area may vary from 5.9 to 6.1 inches, due to supply and machine tolerances.

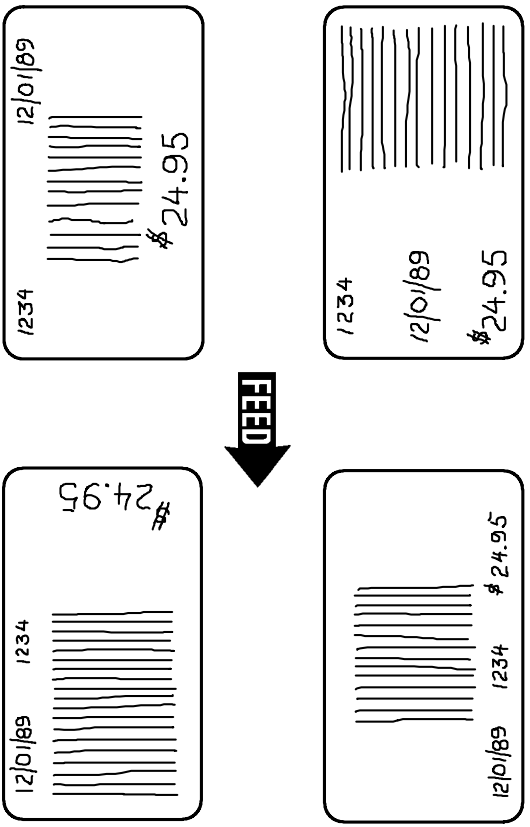
Draw Rough Sketches

When you decide what information you want to print and how it will appear on the supply, draw the information where you want it to appear. Note any areas that are preprinted on the supply.



These sketches show a department number, date, bar code, and price.

Draw several sketches to determine which layout works best for you.



Filling in the Format Worksheet

1. Once you decide on a layout, separate your format contents into groups: text, non-printable text, bar codes, text overlays, lines, and boxes.

2. Make a copy of the Format Worksheet. Copy to two sheets, if necessary.

3. Define the format header. Follow the steps on the following pages.

4. Refer to your rough sketch for the types of fields to include in the format. Find the steps to define each field on the pages listed below.

   Define all fields in the order in which you want to prompt the operator for field data.

   NOTE: If you are using non-printable text fields, define them before defining the field that will print the information.

Type	Examples
Text Fields	Order Number Price Company Name
Constant Text	Text to print on all supplies
Bar Code Fields	Serial Number Merged Fields
Non-Printable Text Fields	"Hold" data for later use (such as a merged field)
Lines	Borders and Highlights Strike through Original Price (on Sale Tag)
Boxes	Borders and Highlights

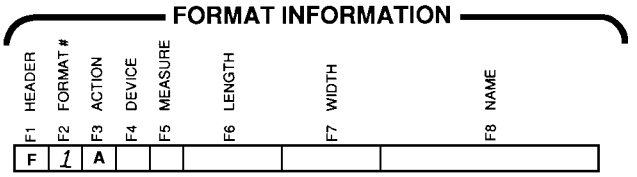
Defining the Format Header

The format header identifies the format and defines important supply information.

Use your copies of the Format Worksheet and Supply Layout Grid to complete these steps.

1. Find "Format Header" on the Format Worksheet. Assign a number between **1** and **50** to the format you are about to create. Write the format number in box **F2**.

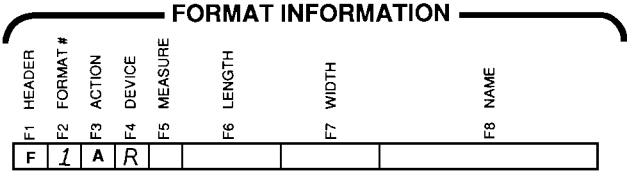
NOTE: Do not use a number already assigned to another format.



2. Decide how the printer will store the format. You have three choices. The printer can

R Store the format until the printer is turned off.
M Store the format permanently on a memory card. (Use only if you have memory card installed.)
T Temporarily store the format. You must include a batch with these formats.

Write **R**, **M**, or **T** in box **F4**.



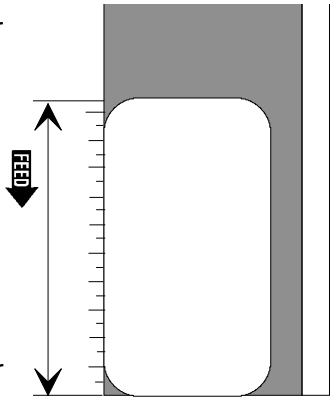
3. What system are you using to measure supplies and fields? You have three choices.

E English. Measure in 1/100 inches.
M Metric. Measure in 1/10 millimeters.
G Graphic. Measure in dots. 192 dots = 1 inch.

Write **E**, **M**, or **G** in box **F5**.

All field dimensions in the format must follow the system selected here.

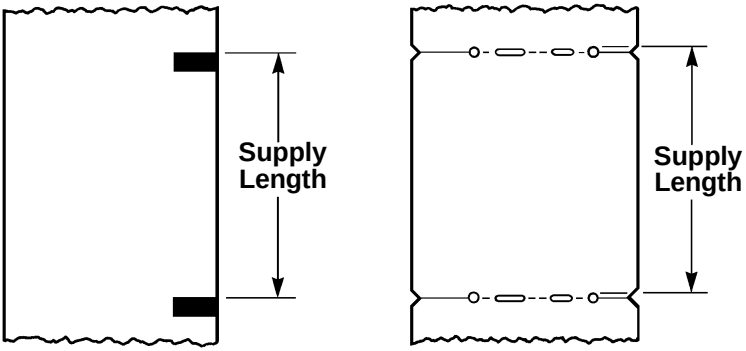
4. Tear off one label or tag from your supply roll. Position it in the lower-left corner of the grid.



Make sure the bottom left corner of the supply aligns with the lower left corner of the grid. (The bottom is the edge that exits the printer first.)

5. Measure the *length* of the supply from bottom to top, using the ruler marks on the left side of the grid.

When measuring aperture and black mark supplies, measure from top to top as shown below.



When measuring labels, use the black sensor marks on the label backing.

6. Write the length in box **F6** on the Format Worksheet. Remember to use your selected units.

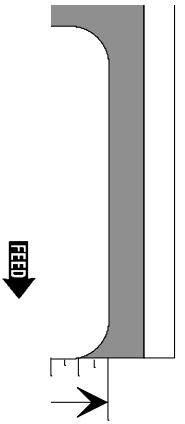
System	Units	Example
English	1/100 in	1 in = 100 units
Metric	1/10 mm	1 mm = 10 units
Graphic	Dots	100 dots = 100 units

Ranges for supply length are

English	**075 - 900**
Metric	**190 - 2290**
Dots	**144 - 1728**

7. Measure the width of the supply from left to right, using the ruler marks at the bottom of the grid.

Write the width in box **F7**.



Ranges for supply width are

English	**075 - 250**
Metric	**190 - 635**
Dots	**144 - 480**

8. Move the supply to the field reference corner just outside the grid. Trace an outline of the supply on the grid.

9. Assign a name (up to eight characters) to the format. Write the name in box **F8**, with quotation marks, as follows:

"LABEL 1"

If you want the printer to assign a name to the format, place quotation marks, with no characters or spaces between them, in box **F8**. The printer will assign a name in the form of **AUTOnnnn**, where **nnnn** is a unique number.

10. Make sure you have filled in boxes **F1** through **F8** on the Format Worksheet.

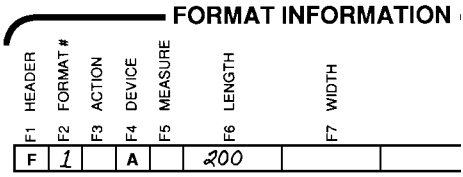
Now you are ready to define the contents of your format. Continue with *Defining Text Fields*, *Constant Text Overlays, Defining Bar Code Fields*, or *Defining Non-Printable Text Fields*.

Defining Text Fields

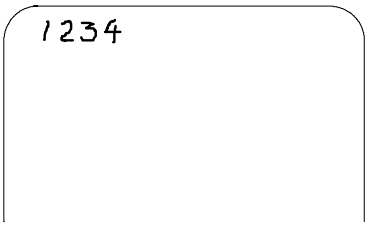
Create a separate definition for each text field. If text falls on two lines, each line of text requires a separate definition.

Note: Define fields in the order you want to prompt the operator.

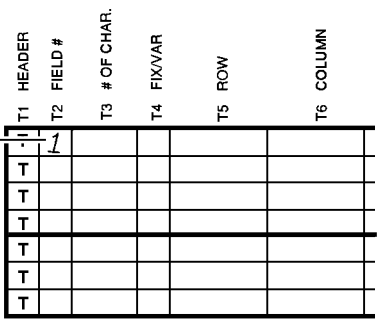
1. Define the format header if you have not already done so.



2. Select a text field from your layout to begin field definition.



3. Find "Text Fields" on the Format Worksheet. Write a number from **1** to **14** in box **T2** to identify the field. Assign numbers in sequence from 1 to 14. Do not use any field number more than once in a format.



4. In box **T3**, write the maximum number of characters, from **1** to **30**, that will appear in the field. Include spaces, $, /, or other symbols that may appear in price or fixed character fields.

A date field, for example, may have a maximum of eight characters (mm/dd/yy).

NOTE: If you are generating a check digit for this field, allow an extra character for the check digit.

5. Write **V** or **F** in box **T4** to indicate the following.

F Fixed length. The field always has the same number of characters.
V Variable length. The number of characters in the field may vary.

6. Refer to the samples on the next page to select a font style for the field.

Standard Font

Reduced Font

Bold Font

OCRA -Like Font

NOTE: These tables do not show all available characters. See Appendix C for a complete list of characters available in each field.

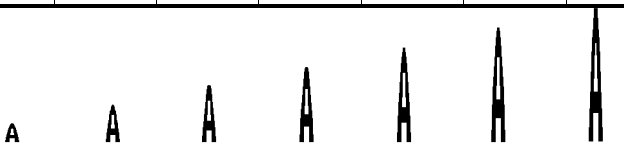
7. Determine the height of the field.

a. Find your selected font and the desired height from the table below.

b. Draw two lines on your Layout Grid to show the bottom and the top of the text field.

Font Magnification

Standard

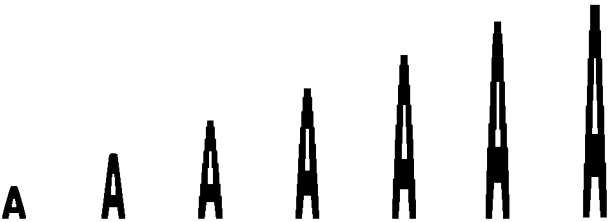


	1x	2x	3x	4x	5x	6x	7x
1/100 in.	11.4	22.8	34.2	45.6	57.0	68.4	79.8
1/10 mm	29.1	58.2	87.3	116.4	145.5	174.6	203.7
Dots	22	44	66	88	110	132	154

Reduced

	1x	2x	3x	4x	5x	6x	7x
1/100 in.	7.3	14.6	21.9	29.2	36.5	43.8	51.1
1/10 mm	18.5	37.0	55.5	74.0	92.5	110.0	129.5
Dots	14	28	42	56	70	84	98

Bold



	1x	2x	3x	4x	5x	6x	7x
1/100 in.	17.7	35.4	53.1	70.8	88.5	106.2	124
1/10 mm	44.9	89.8	134.7	179.6	224.5	269.4	314
Dots	34	68	102	136	170	204	238

OCRA-Like (1x only)

1/100 in.	12.5
1/10 mm	31.7
Dots	24

8. Determine the maximum width of the field.

a. Find your selected font and the desired width below.

b. Multiply the number in box **T3** by the character width below. The result is the width of the field.

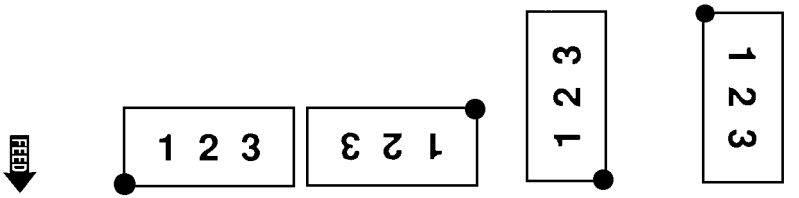
c. Draw two lines on the Layout Grid to show the right and left sides of the field.

Width Mag.	Units	Standard Character Width	Standard Sample	Reduced Character Width	Reduced Sample	Bold Character Width	Bold Sample
1x	1/100 in.	8.85		4.17		14.06	
	1/10 mm	22.49		10.58		33.72	
	Dots	17	A	8	A	27	A
2x	1/100 in.	16.15		7.81		26.56	
	1/10 mm	41.01		19.84		67.47	
	Dots	31	A	15	A	51	A
3x	1/100 in.	23.44		11.46		39.06	
	1/10 mm	59.53		29.10		99.22	
	Dots	45	A	22	A	75	A
4x	1/100 in.	30.73		15.10		55.56	
	1/10 mm	78.05		38.36		130.97	
	Dots	59	A	29	A	99	A
5x	1/100 in.	38.02		18.75		64.06	
	1/10 mm	96.57		47.63		162.72	
	Dots	73	A	36	A	123	A
6x	1/100 in.	45.31		22.40		76.56	
	1/10 mm	115.09		56.89		194.47	
	Dots	87	A	43	A	147	A
7x	1/100 in.	52.60		26.04		89.06	
	1/10 mm	133.61		66.15		226.22	
	Dots	101	A	50	A	171	A

The OCRA-like 1x character width is 8.32 (English), 29.10 (Metric), and 22 (Dots).

NOTE: This table includes default character spacing.

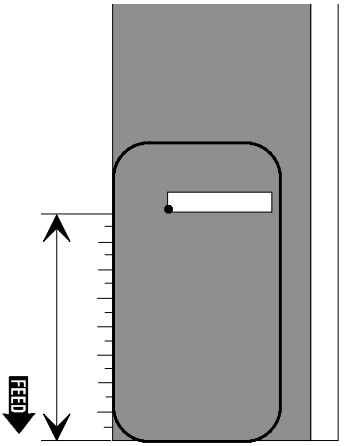
9. On the Supply Layout Grid, mark the lower-left corner of the field as you read it from left to right. This is the *pivot point*.



10. Measure from the bottom of the print area to the pivot point to find the row location. Write the distance, in your selected units, in box **T5**.

Ranges for row location are

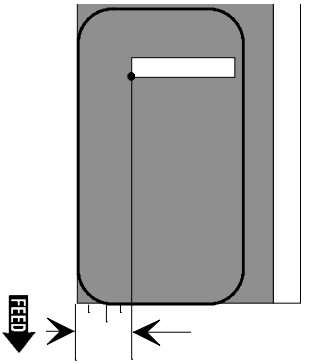
English	**0 - 600**
Metric	**0 - 1525**
Dots	**0 - 1152**



11. Measure from the left edge of the print area to the pivot point to find the column location. Enter the distance, in your selected units, in box **T6**.

Ranges for column location are

English	**0 - 200**
Metric	**0 - 559**
Dots	**0 - 384**



12. You can alter space between characters. This space is measured in dots (1/192 inch). Write the number of dots (**0** to **99)** in box **T7**. Enter **0** for default character spacing.

Any number other than 0 or the default number will affect your field width.

Default spacing is

Standard	3 dots
Reduced	1 dot
Bold	3 dots
OCRA-like	3 dots

The character width chart earlier in this chapter reflects default spacing.

13. Write **1**, **2**, **3**, or **4** in box **T8** to indicate your font selection. Refer to the table earlier in this chapter for samples.

1	Standard font
2	Reduced font
3	Bold font
4	OCRA-like font

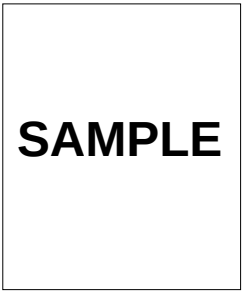
14. Write a number from **1** to **7** in box **T9** to indicate the number of times to magnify character *height*. Refer to the table on page 2-16. Enter **1** to use the standard size.

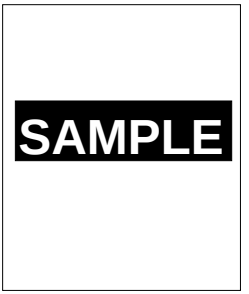
15. Write a number from **1** to **7** in box **T10** to indicate the number of times to magnify character *width*. Refer to the table on page 2-17. Enter **1** to use the standard size.

16. Decide how you want to display characters. Write **B** or **W** in box **T11**.

B Black characters on white background

W White characters on black background





17. Decide whether you want text to align

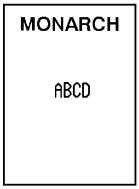
on the **L**eft side of the field,
on the **R**ight side of the field, or
in the **C**enter.

Write **L**, **R**, or **C** in box **T12** on the Format Worksheet.

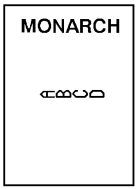
18. You can print characters at various rotations within the field. *Character rotation* indicates the position of the characters with respect to the *field*, **not** with respect to the supply.

Character rotation selections are

0 Tops of characters point to **top** of field.



1 Tops of characters point to **left** of field.



2 Tops of characters point to **bottom** of field.

3 Tops of characters point to **right** of field.

Write **0**, **1**, **2**, or **3** in box **T13** on the Format Worksheet.

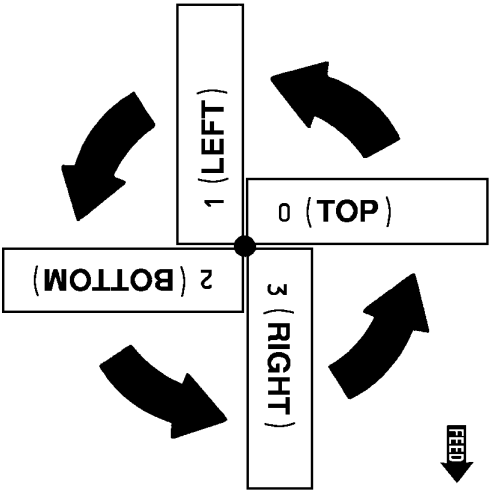
19. Select the number for field rotation from the list below. Write **0**, **1**, **2**, or **3** in box **T14**. Field rotation indicates the position of the field with respect to the supply.

0 Top of field points to **top** of supply.

1 Top of field points to **left** edge of supply.

2 Top of field points to **bottom** of supply.

3 Top of field points to **right** edge of supply.



20. Make sure you filled in boxes **T1** through **T14**.

T1 HEADER	T2 FIELD #	T3 # OF CHAR.	T4 FIX/VAR	T5 ROW	T6 COLUMN	T7 GAP	T8 FONT	T9 HGT. MAG.	T10 WID. MAG.	T11 COLOR	T12 ALIGNMENT	T13 CHAR. ROT.	T14 FIELD ROT.
T	1	10	V	250	50	0	1	1	1	B	C	0	0
T													

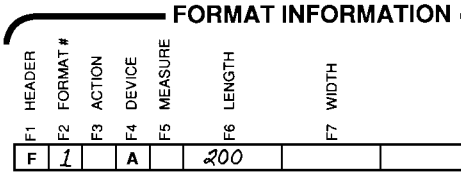
21. You may wish to apply options to this field. See Chapter 3, "Applying Field Options."

22. Repeat steps **1** through **21** for each text field.

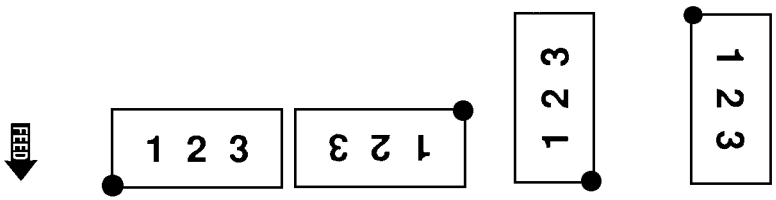
Defining Constant Text Overlays

A constant text overlay is a set of fixed characters that prints on all supplies. This overlay is not a field, and does not count in the field numbering from 1 to 14. The characters in the overlay are fixed, and the user cannot change them. Field options do not apply to overlays.

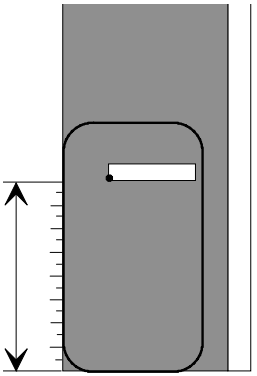
The constant text overlay section is in the lower left corner of the Format Worksheet.



1. Define the format header if you have not already done so.
2. Select a font style from the samples provided earlier in this chapter.
3. Determine the height of the characters, using the table provided in this chapter. Draw two lines on your Layout Grid to show the bottom and the top of the overlay.
4. Determine the maximum width of the overlay, using the table provided in this chapter. Draw two lines on the Layout Grid to show the right and left sides of the overlay.
5. On the Supply Layout Grid, mark the lower left corner of the overlay as you read it from left to right, just as you would mark a text field. This is the *pivot point*.



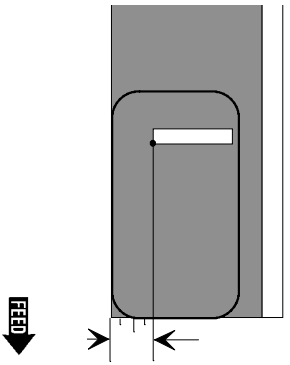
6. Find "Constant Text" on the Format Worksheet. Measure from the bottom of the print area to the pivot point. Write the distance, in your selected units, in box **C2.**



Ranges for row location are

English	**0 - 600**
Metric	**0 - 1525**
Dots	**0 - 1152**

7. Measure from the left edge of the print area to the pivot point. Write the distance in box **C3**.



Ranges for column location are

English	**0 - 200**
Metric	**0 - 559**
Dots	**0 - 384**

8. You can alter space between characters. This *gap* is measured in dots (1/192 inch). Write the number of dots (**0** to **99)** in box **C4**. Enter **0** for default character spacing.

Any number other than 0 or the default number will affect your field width.

Default spacing is

Standard	**3 dots**
Reduced	**1 dot**
Bold	**3 dots**
OCR-like	**3 dots**

The character width chart, provided in this chapter, reflects default spacing.

9. Write **1**, **2**, **3**, or **4** in box **C5** to indicate your font selection. Refer to the table provided in this chapter.

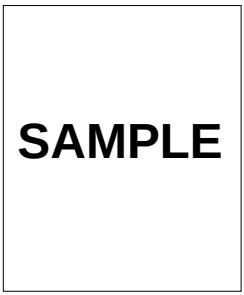
1 Standard font
2 Reduced font
3 Bold font
4 OCRA-like font

10. Write a number from **1** to **7** in box **C6** to indicate the number of times to magnify character *height*. Refer to the table provided in this chapter. Enter **1** to use the standard size.

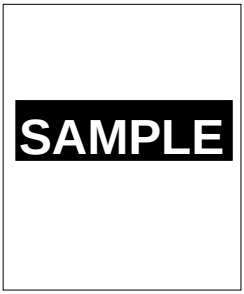
11. Write a number from **1** to **7** in box **C7** to indicate the number of times to magnify character *width*. Refer to the table provided in this chapter. Enter **1** to use the standard size.

12. Decide how you want to display characters. Write **B** or **W** in box **C8**.

B Black characters on white background



W White characters on black background

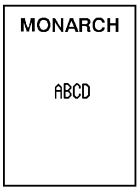


13. Write **L** in box **C9** to align text properly in the field.

14. You can print characters at various rotations within the field. *Character rotation* indicates the position of the character with respect to the *field*, **not** with respect to the supply.

Character rotation selections

0 Tops of characters point to **top** of field.



1 Tops of characters point to **left** of field.

2 Tops of characters point to **bottom** of field.

3 Tops of characters point to **right** of field.

Write **0**, **1**, **2**, or **3** in box **C10**.

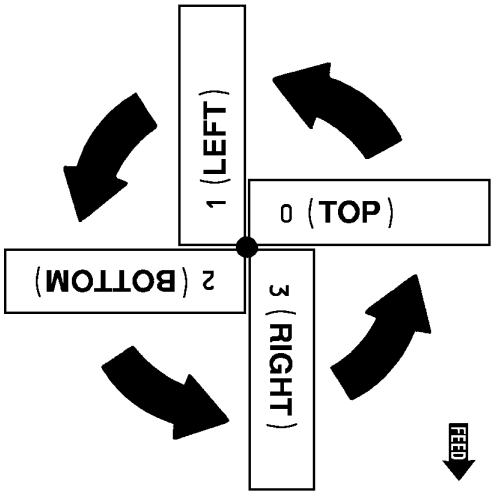
15. Select the number for field rotation from the list below. Write **0**, **1**, **2,** or **3** in box **C11**.

0 Top of field points to **top** of supply.

1 Top of field points to **left** edge of supply.

2 Top of field points to **bottom** of supply.

3 Top of field points to **right** edge of supply.



16. Write the word or phrase you want to print in box **C12**. Place quotation marks around the set of characters. The phrase can be up to **100** characters.

17. Make sure you filled in boxes **C1** through **C12**.

C1 HEADER	C2 ROW	C3 COLUMN	C4 GAP	C5 FONT	C6 HGT. MAG.	C7 WID. MAG.	C8 COLOR	C9 ALIGNMENT	C10 CHAR. ROT.	C11 FIELD ROT.	C12 FIXED CHAR. ("IN QUOTES")
C	30	10	0	1	1	1	B	L	0	0	"MADE IN USA"
C											
C											

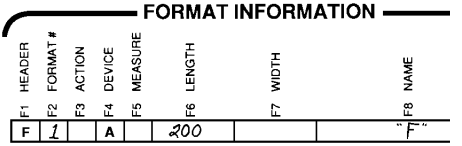
18. Repeat steps **1** through **17** for each constant text overlay.

Defining Bar Code Fields

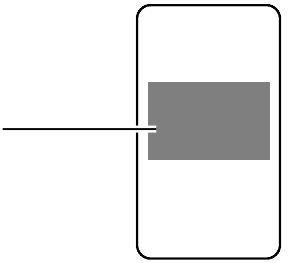
Each bar code field requires a separate definition.

Define fields in the order in which you want to prompt the operator.

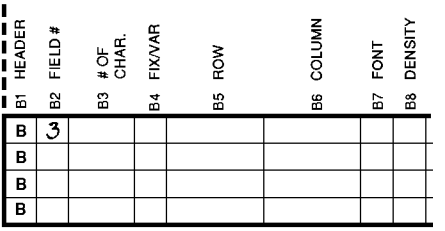
1. Define your format header if you have not already done so.



2. Select a bar code field from your layout to begin field definition.



3. Find "Bar Codes" on the Format Worksheet. Write a number from **1** to **14** in box **B2** to identify the field. Number fields in sequence from 1 to 14. Do not use any field number more than once in a format.



4. In box **B3**, write the maximum number of characters, from **1** to **30**, that will appear in the field. If the bar code uses a check digit, allow an extra character for the check digit.

For UPC and EAN bar codes, use the numbers shown below.

Bar Code	Number of Characters
UPC-A	12
UPC-E	7
EAN-8	8
EAN-13	13

5. Write **V** or **F** in box **B4** to indicate the following.

F Fixed length. The field will always contain the same number of characters.

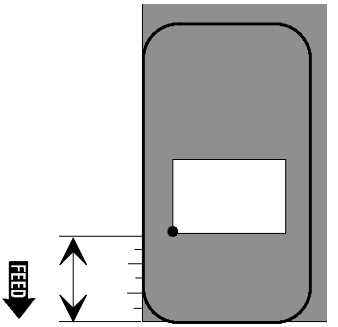
V Variable length. The number of characters in the field may vary.

Enter **F** if using UPC-A, UPC-E, EAN-8, or EAN-13 codes.

6. Mark the corner that is located in the lower left as you read the field from left to right. This is the *pivot point*.

NOTE: When marking the lower left corner of the field, do not include text or numbers that may appear with the bar code.

7. Measure from the *bottom* of the print area to the pivot point on the field. Write the distance, in your selected numbering system units, in box **B5**.

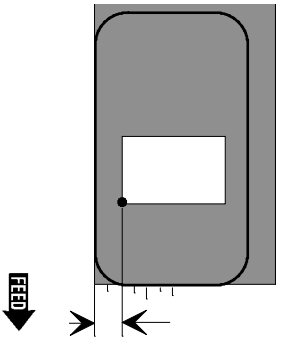


Ranges for the row location:

English	**0 - 600**
Metric	**0 - 1525**
Dots	**0 - 1152**

8. Measure from the *left* edge of the print area to the pivot point. Write the distance, in your selected numbering system units, in box **B6**.

NOTE: Allow a minimum of 1/10 inch between the bar code and the edges of the print area.



Ranges for the column location:

English	**0 - 200**
Metric	**0 - 559**
Dots	**0 - 384**

9. Write the number of the bar code you want to use in box **B7**.

Number	**Bar Code**
1	UPC-A
2	UPC-E
3	Interleaved 2 of 5
4	Code 39
6	EAN-8
7	EAN-13
8	Code 128

10. Write the *density selector* for your bar code in box **B8**. Refer to the following tables for the appropriate density selector for your specific bar code.

Barcode Type	**Density Selector**	**Density** (% or cpi)	**Narrow Element** (dots/mils)	**Narrow to Wide Ratio**	**Data Length**	**Appearance Codes Available**	**Char Set**
UPCA	**2**	80%	2/10.4	N/A	11 or 12	1,5,6	0 to 9
	4	120%	3/15.6			**7** or 8	
UPCE	**2**	80%	2/10.4	N/A	6 or 7	1,5,6	0 to 9
	4	120%	3/15.6			**7** or 8	
EAN8	**2**	80%	2/10.4	N/A	7 or 8	1,5,6	0 to 9
	4	120%	3/15.6			**7** or 8	
EAN13	**2**	80%	2/10.4	N/A	12 or 13	1,5,6	0 to 9
	4	120%	3/15.6			**7** or 8	
Interleaved 2 of 5	1	1.0	21/109.9	1:3.0	0 to 30[2]	**8**	0 to 9
	2	2.0	12/62.8	1:2.5			
	3	3.0	7/36.6	1:3.0			
	4	4.0	6/31.4	1:2.5			
	5	5.3	4/20.9	1:3.0			
	6	6.0	4/20.9	1:2.5			
	7	6.9	3/15.6	1:3.0			
	8	8.4	3/15.7	1:2.3			
	9	9.2	3/15.7	1:2.0			
	10	10.7	2/10.4	1:3.0			
	11	10.7	2/10.4	1:3.0			
	12	12.0	2/10.4	1:2.5			
	13	13.7	2/10.4	1:2.0			
Code 39	3	3.3	4/20.9	1:2.5	0 to 30[3]	**8**	SPACE
	4	4.0	3/15.6	1:3.0			$%*+-./
	6	6.0	2/10.4	1:3.0			0 to 9
	7	6.6	2/10.4	1:2.5			A to Z
Code 128	4	4.3/8.7	4/20.8		0 to 30[2]	**8**	00H to 7FH[1]
	6	5.8/11.7	3/15.6				
	8	8.7/17.5	2/10.4				

Default values are shown in bold.

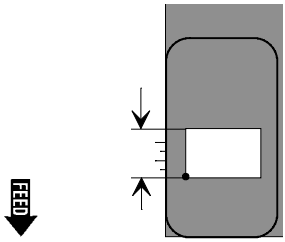
(1) **201 - Function Code 1** **202 - Function Code 2**
203 - Function Code 3 **204 - Function Code 4**

(2) **Actual maximum number of characters is limited by the supply size and density combination which enable the bar code to be totally imaged on the tag or label.**

11. Decide how tall you want the bar code to be. Enter the bar code height, in your selected units, in box **B9**.

Here are the *minimum* recommended heights for bar codes:

English	**20**
Metric	**51**
Dots	**39**



12. If you use UPC or EAN bar codes, decide how you want human readable characters to appear. Write **1**, **5**, **6**, **7**, or **8** in box **B10**.

1 No check digit or number system

5 Number system at bottom, no check digit

6 Check digit at bottom, no number system

7 Check digit and number system at bottom

8 No text, bar code only

For all other bar codes, enter **8** in box **B10**.

NOTE: If you are using 1.2" wide supplies and printing UPCA or EAN13 bar codes using option 7 in box **B10**, the printer may omit the check digit character because the supply may be too narrow. To print the check digit character on the label:

- Use option 5 in box **B10** of the bar code field.
- Define a one-character field of reduced font and add Option 4 to copy the check digit from the corresponding bar code field.
- Position the check digit field so it fits on the label.

13. Decide whether you want the bar code to align

on the **L**eft side of the field,
on the **R**ight side of the field, or
in the **C**enter.

Write **L**, **R**, or **C** in box **B11**.

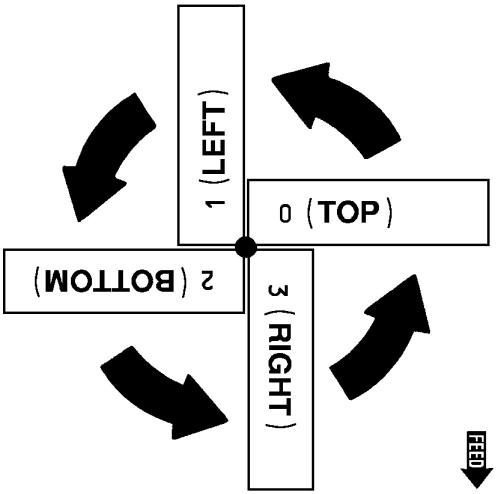
14. Select the number for field rotation from the list below. Write **0**, **1**, **2**, or **3** in box **B12**.

0 Top of field points to **top** of supply.

1 Top of field points to **left** edge.

2 Top of field points to **bottom** of supply.

3 Top of field points to **right** edge.



15. Make sure you filled in boxes **B1** through **B12**.

B1 HEADER	B2 FIELD #	B3 # OF CHAR.	B4 FIX/VAR	B5 ROW	B6 COLUMN	B7 FONT	B8 DENSITY	B9 HEIGHT	B10 TEXT	B11 ALIGN	B12 FLD ROT.
B	4	12	F	160	40	1	2	80	4	C	0
B											

16. You may wish to apply options to this field. If so, see Chapter 3, "Applying Field Options."

17. Repeat steps **1** through **16** for each bar code.

Defining Non-Printable Text Fields

Non-printable text fields enable you to enter data without printing it in its entered form. Typically, non-printable fields "hold" data that will combine with other fields to form a merged field.

NOTE: Define non-printable text fields before you define the field that will print the information in these fields.

In the following example, the operator enters data into four non-printable fields. The format merges data from these fields to form field #5, then prints it as a bar code. Chapter 3, "Applying Field Options," tells how to merge fields.

Field #	Prompt	Data	Field Type
1	SKU:	20374	Non-printable
2	DEPT:	339	Non-printable
3	SIZE:	8	Non-printable
4	COLOR:	15	Non-printable
5	none	20374339815	Bar Code

Each non-printable text field requires a separate definition. Define the fields in the order you want to prompt the operator.

1. Define your format header if you have not already done so.
2. Find "Non-Printable Text Fields" on the Format Worksheet. Write a number between **1** and **14** to identify this field in box **D2**. Number fields in sequence from 1 to 14.

   NOTE: Do not use any field number more than once in a format.

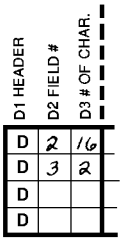
3. Write the maximum number of characters to be entered in this field **(1-30)** in box **D3**.

NOTE: If you will later copy this field into another field, remember the maximum number of characters for the final field is 30. Allow only as many characters as you need. Also, if you are copying into a bar code field, the maximum number of characters in the destination bar code is determined by the bar code type (UPCA-12, EAN-13, etc.).

4. You need to apply field options to manipulate the text entered in this field. You will most likely *copy* data from this field into another field. Follow instructions in Chapter 3, "Applying Field Options."

5. Make sure you filled in boxes **D1** through **D3**.

6. Repeat steps **1** through **5** for all non-printable fields.



Lines and Boxes

Use lines to form borders, mark out original prices on sale tags, etc. Each line requires a separate definition. Use boxes to form borders or highlight items of interest.

The sections for lines and boxes are in the lower portion of the Format Worksheet.

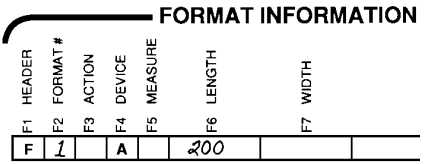
Defining Lines

Only horizontal and vertical lines are supported. There are two ways to define lines.

Segments You choose the starting point and ending point.

Vectors You choose the starting point, the angle, and the length of the line.

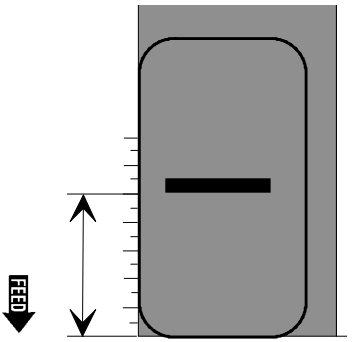
Defining Lines as Segments



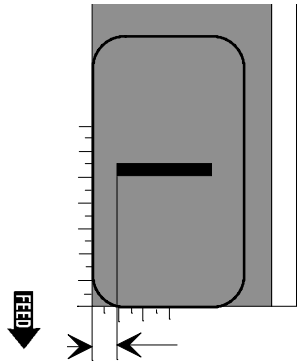
1. Define the format header if you have not already done so.
2. Select a line from your layout to begin field definition.
3. Find "Lines" on the Format Worksheet. Write **S** in box **L2.**
4. Measure from the *bottom* of the print area to the point where the line begins. Write the distance, in your selected units, in box **L3**.

   Ranges for row location are

English	**0 - 600**
Metric	**0 - 1525**
Dots	**0 - 1152**



5. Measure from the *left* edge of the print area to the point where the line *begins*. Write the distance, in your selected units, in box **L4**.



Ranges are

English	**0 - 200**
Metric	**0 - 559**
Dots	**0 - 384**

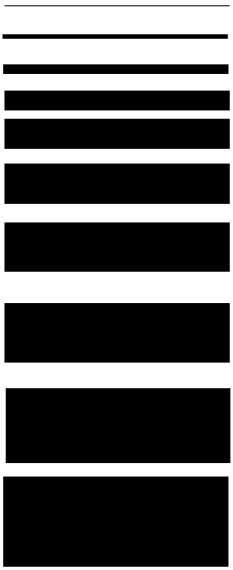
6. Measure from the *bottom* of the print area to the point where the line *ends*. Write the distance in box **L5**.

NOTE: For *horizontal* lines, the number in box **L5** must match box **L3**.

7. Measure from the *left* edge of the print area to the point where the line *ends*. Write the distance in box **L6**.

NOTE: For *vertical* lines, the number in box **L6** must match box **L4**.

8. Using the chart below for reference, write your desired line thickness **(1-99)** in box **L7**. Thickness is measured in dots (1 dot = 1/192 inch).

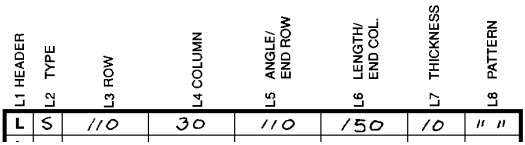
Thickness	Example
1 5 10 20 30 40 50 60 75 90	

9. Place a set of quotation marks, with nothing in the quotes, in box **L8**.

This step completes the necessary syntax for line definition. It should look like this:

""

10. Make sure you have filled in boxes **L1** through **L8**.



11. Repeat steps **1** through **10** for each line segment.

Defining Lines as Vectors

1. Follow the steps to define lines as segments with the exception of boxes **L2**, **L5**, and **L6**.

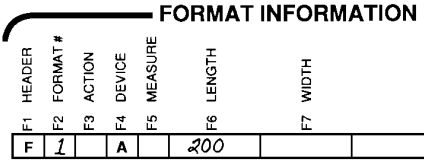
2. Write **V** in box **L2**.

3. In box **L5**, write the direction the line travels from its origin: **0**, **90**, **180**, or **270** (in degrees).

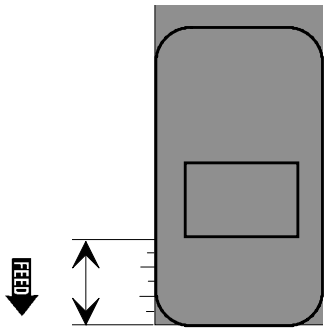
4. Write the length of the line, in your specified units, in box **L6**.

Defining Boxes

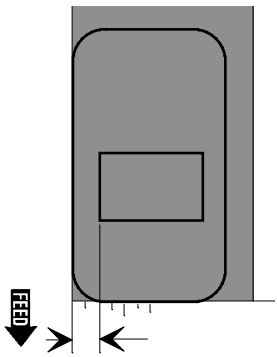
1. Define the format header if you have not already done so.



2. Find "Boxes" on the Format Worksheet. Measure from the *bottom* of the print area to the *lower-left corner* of the box. Write the distance, in the units selected for your format, in box **Q2**.



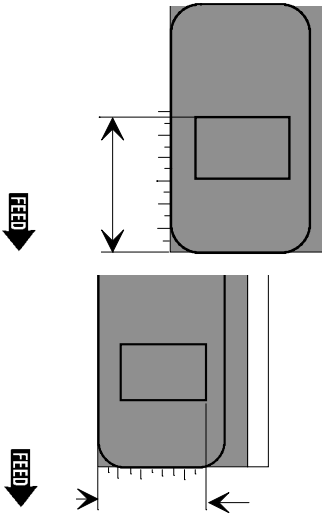
3. Measure from the *left* edge of the print area to the *lower-left corner* of the box. Write the distance, in your selected units, in box **Q3**.



4. Measure from the *bottom* of the print area to the *upper-right corner* of the box. Write the distance in box **Q4**.

5. Measure from the *left* edge of the print area to the *upper-right corner* of the box. Write the distance in box **Q5**.

6. Using the chart below for reference, write your desired line thickness **(1-99)** in box **Q6**. Thickness is measured in dots (1 dot = 1/192 inch).



Thickness	Example
1	
5	
10	
20	
30	
40	
50	
60	
75	
90	

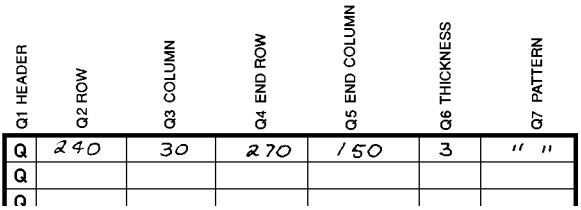
NOTE: Line thickness fills toward the center of the box.

7. Place a set of quotation marks, with nothing in the quotes, in box **Q7**.

This step completes the necessary syntax for box definition. It should look like this:

""

8. Make sure you have filled in boxes **Q1** through **Q7**.



Q1 HEADER	Q2 ROW	Q3 COLUMN	Q4 END ROW	Q5 END COLUMN	Q6 THICKNESS	Q7 PATTERN
Q	240	30	270	150	3	" "
Q						
Q						

9. Repeat steps **1** through **8** for each box.

3. Applying Field Options

Field options enable you to manipulate fields to display information correctly with minimal effort by the operator.

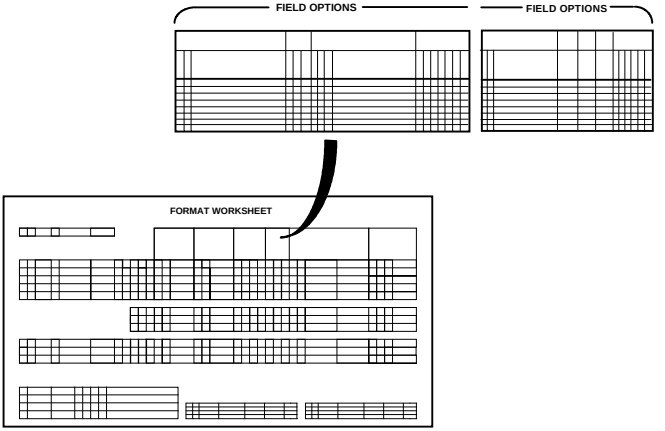
You can apply options to most text, non-printable text, or bar code fields. Field options are not required for any format, but you can use them to simplify batch entry and add flexibility to formats.

You can format a text field to display as a price, for example. You can also create a set of prompts so the operator knows what information to enter.

Certain combinations are not recommended. For example, it is not recommended to format a bar code as a price field.

This chapter tells how to accomplish various tasks with field options. See Chapter 11, "Online Information," for a complete functional listing of the field options available for 9401 and 9402 printers.

"Field Options" is in the upper-right section of the Format Worksheet. See the example that follows.



Option	Description
1	Define fixed characters
2	General data type restrictions
3	Detailed data type restrictions
4	Copy data from another field
5	Define data entry source
20	Define data entry prompt
30	Pad data to left or right
31	Define check digit mode, select algorithm
42	Format as a price field
60	Define incrementing/ decrementing field

You can apply more than one option to most fields. For example, you can format a field as a price, then define a prompt for the field.

Also, you cannot use certain options together on a field. For example, you cannot *increment* a *price* field. These limitations will be noted with each option.

NOTE: Due to more rigid syntax checks, be aware that data streams that run successfully with older versions of the software may now produce errors on the field options.

Defining Fixed Data (Option 1)

You may want some information in your format to print on all labels or tags. A company name or a store number is an example of fixed data.

Since this information is always printed, there is no need for the operator to enter it in every batch. You can apply an option so this information is printed automatically.

You use Option **1** with Option **3** to print a field as a date or time. See "Creating Date or Time Fields," later in this chapter.

You can use option 1 only once per field.

When using option 1 to place fixed characters in part of the field, make sure you place an underscore (_) in each position in the field that is not a fixed character. This modification won't change the length of the field.

In the following example, the field has six characters, but only the characters in positions 1, 2, and 3 are fixed.

```
{F,20,A,R,E,100,200,"Fix Char" ¦
 T,2,6,V,061,010,2,2,2,1,B,L,0,0 ¦
 R,1,"ABC___" ¦
 . . .}
```

max. 6 characters
pos. 4, 5, 6 open

Entire Field Fixed Character Definition

There are two ways to define an entire fixed field. The best way to do this is to define a *Constant Text Overlay* as shown in Chapter 2. Constant Text Overlays are not counted as fields, allowing more fields in a format. Overlays can improve printer performance, because they require less memory than standard fields.

However, if you want to define a fixed field that can be copied into another field, use Option **1**.

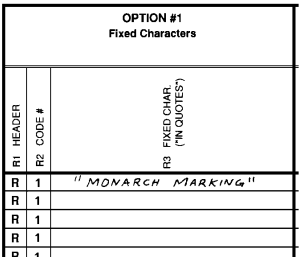
Use only with Option **5** when defining fixed characters for the entire field.

1. Define your text or bar code field on the Format Worksheet as shown in Chapter 2, "Designing a Format." Remember:
   - Write **F** in box **T4** to specify a fixed field length.
   - Make sure the maximum length in box **T3** is the same as the number of characters you will place in the field.
2. Find Option **1** on the Format Worksheet. This option specifies fixed characters. For information on how Option 1 works, see "Defining Fixed Data."
3. Write the exact characters for this field in box **R3**, after **1**. Place quotation marks around the phrase, like this:

   "MONARCH MARKING"

   Notice that spaces in the phrase are fixed characters.

   Make sure you enter the fixed characters in the same row as the text or bar code field to which they apply.



4. Find Option **5** in the same row on the Format Worksheet.
5. Write **N** in box **R3**, after **5**, so the printer will not prompt the operator for this field.

Partial Field Fixed Character Definition

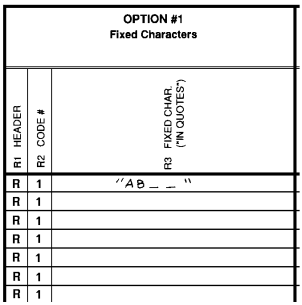
Use with any option

1. Define your field as shown in Chapter 2, "Designing a Format."
2. Find Option **1** on the Format Worksheet. See "Defining Fixed Data" for information on how Option **1** works.
3. In box **R3**, after **1**, write the fixed characters as you want them to appear in the field. Make sure you write the characters in the same row as the text or bar code field definition.

   Place an **underscore (_)** in positions where you do **not** want fixed characters.

   This character string defines fixed characters for positions 1 and 2, but allows user entry in positions 3 and 4:

   "AB_ _"



OPTION #1
Fixed Characters

R1 HEADER	R2 CODE #	R3 FIXED CHAR ("IN QUOTES")
R	1	"AB_ _"
R	1	
R	1	
R	1	
R	1	
R	1	
R	1	

4. Apply Option **20** to define a data entry prompt for this field **OR** apply Option **4** to copy data into the non-fixed character positions. To copy data into a field, refer to that section later in this chapter.

Data Type Restrictions and Data Entry Templates (Options 2 and 3)

You can use Options **2** or **3** only once per field.

If you do batch entry only in the data stream, you do not need to apply Options **2** and **3**. Use these options only for offline batch entry.

Restricting Data Types

Normally, you can print all characters (letters, numbers, and symbols) in text fields. You may want to restrict text in a field to certain character types, such as letters or numbers only. You can use detailed restrictions to further limit these character sets.

General Restrictions

This procedure defines a character set for the entire field. You can limit acceptable characters to

- letters only
- numbers only
- symbols only
- any combination of two of the above.

NOTE: See Appendix C, "Printable Characters," for a complete list of printable characters.

1. Define your text or bar code field on the Format Worksheet as shown in Chapter 2, "Designing a Format."
2. Find Option **2** on the Format Worksheet. This is the option for general character restrictions.

Do not use with:	
Option	**Description**
3	Detailed Character Restrictions

3. In box **R3**, write the number from the following list to choose the character type for this field.

Number	Character Type
1	Numeric only (0..9)
2	Letters only (A..Z,a..z)
3	Symbols only (printable characters other than letters or numbers)
4	Letters and numbers only
5	Numbers and symbols only
6	Letters and symbols only

Spaces are permitted in all categories.

Enter this number in the same row as the field to which it applies.

A use for this option is a *quantity* field. A quantity field should allow the operator to enter only numbers. The code to allow numbers only is **1**. Fill in box **R3** as shown to the right.

OPTION # 2 Restrict Data Type:		
R1 HEADER	R2 CODE #	R3 CHAR. CODE
R	2	/
R	2	
R	2	
R	2	
R	2	
R	2	
R	2	

Detailed Character Restrictions

This option provides more specific restrictions than in "General Restrictions." Use this option to use only parts of a character set, such as the letters A through F or the numbers 1 through 4.

NOTE: See Appendix C for a complete list of printable characters.

These steps let you assign character restrictions not available with Option **2**.

1. Define your text or bar code field as shown in Chapter 2.

2. Find Option **3** on the Format Worksheet. Use this option for detailed character restrictions.

3. Write **S** in box **R3** after **3**. Write the **S** in the same row as the field to which you are applying restrictions.

Do not use with: Option	Description
2	General Character Restrictions

4. In box **R4**, list the characters you wish to accept for this field. For example, to allow only digits 1 through 5, write **12345**. To allow only letters A through F, write **ABCDEF**. You can list a maximum of **30** characters.

Place all of the characters that apply in box **R4** after **S**. Place quotation marks around the entire list, like this:

"123ABC"

A sample use for this option is a field on a patient record containing a patient's blood type. Acceptable characters would be **A**, **B**, **O**, **+**, or **-**. List them this way:

"ABO+-"

OPTION #3
Detailed Data Restrictions

R1 HEADER	R2 CODE #	R3 S/T	R4 CHAR. STRING ("IN QUOTES")
R	3	S	"ABO+-"
R	3		
R	3		
R	3		

Example

Consider the example for Option **1**. If you use Option **4** to copy data into the non-fixed positions (4, 5, 6), make sure that the number of characters copied is 3 and the start position in the destination field is 4.

NOTE: If you set the start position in the destination field to 1, the copied data will overwrite the fixed positions.

Restricting Data Types by Character Position

You can create a template to accept only certain types of data in each character position.

1. Define your text or bar code field on the Format Worksheet as shown in Chapter 2, "Designing a Format."

   When determining the number of characters, allow for fixed characters, plus all characters to be entered by the operator.

2. Find Option **3** on the Format Worksheet.

3. Write **T** in box **R3**, after **3**. Make sure you write the **T** in the same row as the text or bar code field to which it applies.

4. In box **R4**, after **T**, define the type of character for each character position. Use the *character indicators* below.

Indicator	Data Type
*	any printable character
#	any digit 0-9
@	any letter a-z, A-Z
_	no user input for this position

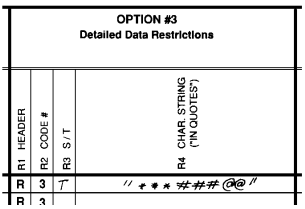
Use the underscore in positions that are fixed with Option **1** or copied into the field with Option **4**.

Place quotes around the string of characters, like this:

"***###@@"

This template defines

- any character in positions 1-3
- digits only in positions 4-6
- letters in positions 7 and 8.



The following template allows digits only in positions 1-4.

In positions 5-8, data is either fixed using Option **1** or copied in using Option **4**.

"####_ _ _ _"

The operator will see the standard or defined prompt on the printer when ready to enter data for this field

```
Field  1:
_ _ _ _ _ _ _ _
```

The printer will beep or an error will result if the operator tries to enter an incorrect data type in a character position.

NOTES: You can define a template up to 30 characters long, but the printer will only display 16 characters at one time.

The character template must contain the same number of characters as the field.

See Appendix C, "Printable Characters," for a complete list of printable characters.

Creating Date or Time Fields

You must apply Options **1** and **3** to print a date or time field. For information about how Option **1**, see "Defining Fixed Data."

NOTE: The printer has no built-in clock. The operator must enter the correct time or date.

Do not use with:	
Option	**Description**
2	General Character Restrictions

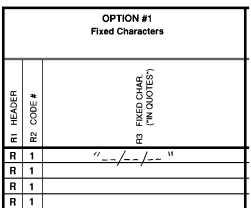
1. Define your text field on the Format Worksheet as shown in Chapter 2, "Designing a Format." Remember

- Write **8** in box **T3** to allow for a maximum of eight characters.
- Write **F** in box **T4** to specify a fixed length field.

2. Find Option **1** on the Format Worksheet. This option will fix the slashes or colons in the date or time field.

3. In box **R3**, after **1**, write the fixed characters (/, :, or ;) in their respective character positions and underscores in all other positions. Put quotation marks around the character string, like this:

"_ _/_ _/_ _"

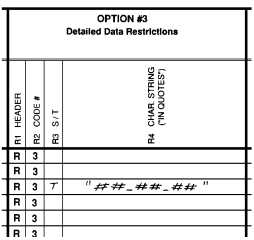


4. Find Option **3** on the same row of the Format Worksheet. This option creates a data template.

5. Write **T** in box **R3**, after **3**.

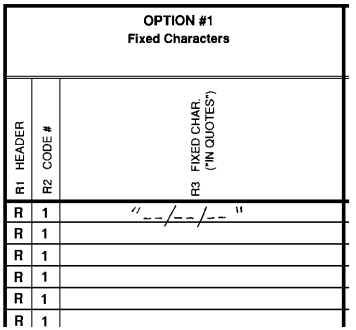
6. In box **R4**, after **T**, write the pound sign (#) in positions to be filled by numbers. Place underscores (_) in the fixed character positions defined by option 1. Place quotes around the string of characters, like this:

"##_##_##"



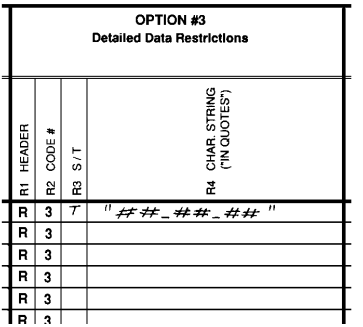
Here is an example of a template for a date field.

This template places fixed slashes (*/*) in positions 3 and 6, and accepts only digits in the other positions.



OPTION #1
Fixed Characters

R1 HEADER	R2 CODE #	R3 FIXED CHAR. ("IN QUOTES")
R	1	" _ _ / _ _ / _ _ "
R	1	
R	1	
R	1	
R	1	
R	1	

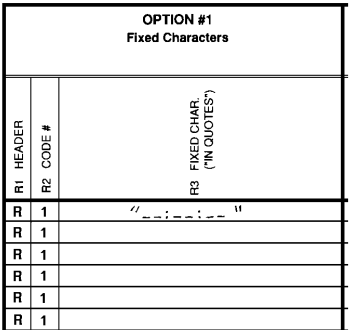


OPTION #3
Detailed Data Restrictions

R1 HEADER	R2 CODE #	R3 S / T	R4 CHAR. STRING ("IN QUOTES")
R	3	T	" ## ## _ ## ## _ ## "
R	3		
R	3		
R	3		
R	3		
R	3		

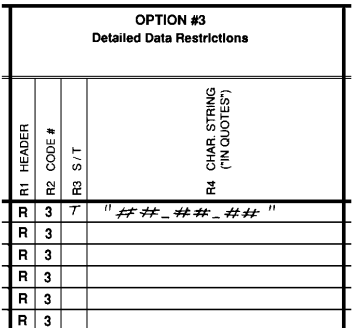
Here is an example of a template for a time field.

This template places fixed colons (**:**) in positions 3 and 6, and accepts only digits in the other positions.



OPTION #1
Fixed Characters

R1 HEADER	R2 CODE #	R3 FIXED CHAR. ("IN QUOTES")
R	1	" _ _ : _ _ : _ _ "
R	1	
R	1	
R	1	
R	1	
R	1	



OPTION #3
Detailed Data Restrictions

R1 HEADER	R2 CODE #	R3 S / T	R4 CHAR. STRING ("IN QUOTES")
R	3	T	" ## ## _ ## ## _ ## "
R	3		
R	3		
R	3		
R	3		
R	3		

Copying Data Into a Field (Option 4)

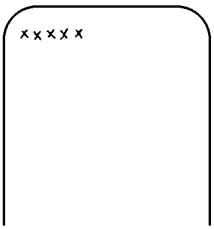
You can use this option up to 4 times on one field. This option is the only one you can apply more than once to a field.

Use with any option

You can create a field that uses data from another field. This is useful for creating merged fields or sub-fields. You can copy the information from multiple fields into one field, by applying the copy procedure more than once.

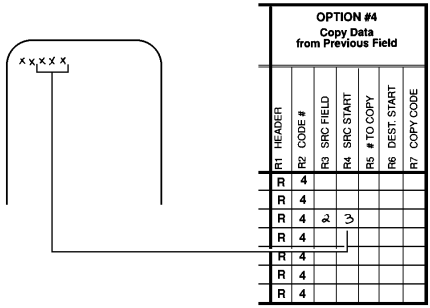
1. Define all fields from which data will be copied, as shown in Chapter 2, "Designing a Format."
   - Make sure the fields have field numbers lower than the field into which data will be copied (box **T2** , **D2**, or **B2**).
2. Define a text or bar code field to hold the copied information. Remember:
   - Make sure the maximum length in box **T3** or **B3** allows for the number of characters you will place in the field, including any price or fixed characters inserted by the printer.
   - The maximum number of characters in the field into which data is copied cannot exceed **30**.
3. Find Option **4** on the Format Worksheet. This option copies data from a previous field.

   Stay in the same row on the worksheet as the field that will contain the *copied* data.



4. Find the text or bar code field where the data originates. This is the *source field*. Write the field number (from box **T2**, **D2**, or **B2**) in box **R3**, after **4**.

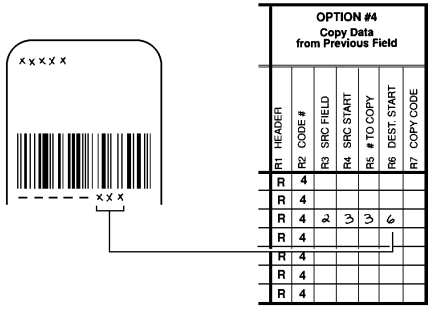
5. In the source field, note the position of the first character to be copied. Character positions are numbered **1** to **30**, starting from the left. Write the position number of the first character to copy in box **R4**.



f10

6. Write the number of characters to copy in box **R5**.

7. In the new field (called the *destination field*), select the first character position to receive copied data. Write the starting position in box **R6**.



f11

8. Determine whether you want to copy all information in its formatted state (formatted as price, check digit, etc.) or to copy only the unaltered data, without price characters, check digits, or pad characters. In box **R7**, write the number **1** or **2** as follows.

1 Copy field as is (including check digits, price symbols, pad characters, etc.)

2 Copy unformatted data (fixed characters and entered data only).

9. Make sure you enter the copy information in the same row as the field to contain *copied* data.

10. If you want to copy data from more than one field, repeat steps **1** through **9** for each field to copy. Continue with rows just below the boxes you just completed.

OPTION #4
Copy Data from Previous Field

R1 HEADER	R2 CODE #	R3 SRC FIELD	R4 SRC START	R5 # TO COPY	R6 DEST. START	R7 COPY CODE
R	4	1	1	3	1	1
R	4	2	1	3	4	1
R	4	3	1	1	7	1
R	4	4	1	4	8	1
R	4					
R	4					

11. Go to Option **5** on the same row of the worksheet. In box **R3**, after **5**, write **N** to eliminate the operator prompt for this field. See "Defining Data Entry Sources" for information on Option **5**.

Merging Fields

You can copy data to merge the contents of up to four fields. Follow the steps under "Copying Data" as many times as necessary to copy the appropriate fields into the merged field.

In the following example, the operator will enter data into two text and two non-printable fields. Data from these fields is merged to form field #5, then printed as a bar code.

Field #	Prompt	Data	Field Type
1	SKU:	203	Non-printable
2	DEPT:	339	Non-printable
3	SIZE:	8	Text
4	COLOR:	BLUE	Text
5	none	2033398BLUE	Bar Code

To create this sequence

1. Define fields 1, 2, 3, and 4.

2. Apply Option **20** to each text and non-printable field to create the prompts. See "Defining a Data Entry Prompt" for information on Option **20**.

OPTION #20
Operator Prompt

R1 HEADER	R2 CODE #	R3 CHARACTER STRING
R	20	"SKU:"
R	20	"DEPT:"
R	20	"SIZE:"
R	20	"COLOR:"

3. Define field #5 as a bar code. Allow enough characters in the bar code field to hold all the copied characters.

4. Apply Option **4** to field #5 once for each *source* field (a total of 4 times).

5. Write **N** in Option **5** for field #5.

OPTION #4
Copy Data from Previous Field

R1 HEADER	R2 CODE #	R3 SRC FIELD	R4 SRC START	R5 # TO COPY	R6 DEST. START	R7 COPY CODE
R	4	1	1	3	1	1
R	4	2	1	3	4	1
R	4	3	1	1	7	1
R	4	4	1	4	8	1

Sub-Fields

You can copy a segment of data from one field into a new location, called a sub-field. For example, extract part of the data in a bar code and display it in text form in a sub-field. Follow the steps under "Copying Data."

Defining Data Entry Sources (Option 5)

You can use Option **5** only once per field. When you use it, place it in the data stream after all other options on the field.

You can define how data is entered into a field. For example, some fields may be entered by the operator at a keyboard, or from a host. If the field holds all fixed characters or copied data only, you can eliminate the operator prompt.

1. Define the text or bar code field on the Format Worksheet as shown in Chapter 2, "Designing a Format."
2. Find Option **5** on the Format Worksheet. This option defines the data input source.
3. In box **R3** after **5**, write the code letter from the list below to indicate how to enter data in the field.

   Make sure you write the code letter in the same row as the field to which it applies.

Use with any option

Code	Data Source
D	Default (computer if online, keypad if offline)
K	Keypad or computer keyboard
H	Host
S	Scanner
N	No user input for this field. **NOTE:** Do not use this code when using Option **20**.

Eliminating the Operator Prompt

The printer normally prompts the user for data for text, non-printable text, and bar code fields. If the field holds all fixed characters or copied data only, you can eliminate the prompt using Option **5**.

To eliminate the prompt, follow the steps above to define the data entry source. Write **N** in box **R3**.

Defining a Data Entry Prompt (Option 20)

The printer normally prompts the user for batch data by field number, like this:

```
Field  1:
_ _ _ _ _ _ _ _
```

You can write a more descriptive prompt that asks the user for the exact information for the field.

NOTE: This option is not recommended on fields filled entirely by fixed characters or copied data.

1. Define your text or bar code field on the Format Worksheet as shown in Chapter 2, "Designing a Format."

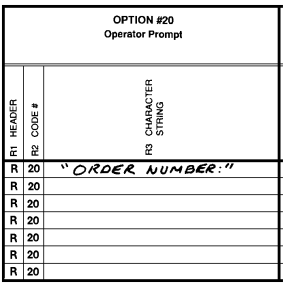
Use with any option

2. Find Option **20** on the Format Worksheet. This option creates a prompt.

3. In box **R3** after **20**, write the exact phrase you want to use to prompt the operator.

Make sure you write the prompt in the same row as the field to which it applies.

Place quotation marks around the phrase, like this:



OPTION #20
Operator Prompt

R1 HEADER	R2 CODE #	R3 CHARACTER STRING
R	20	"ORDER NUMBER:"
R	20	
R	20	
R	20	
R	20	
R	20	
R	20	

"Order Number:"

NOTE: The prompt should be **15** characters or fewer.

The operator will see this screen when ready to enter batch data for this field.

```
Order  Number:
_ _ _ _ _ _ _ _
```

Adding Characters to Pad Fields (Option 30)

You can add characters to one side of a field to pad the field. Padding lets you fill in remaining spaces when the data does not fill an entire field.

1. Define your text or bar code field on the Format Worksheet as instructed in Chapter 2, "Designing a Format." Remember

- Write **V** in box **T4** or **B4** to ensure this is a variable length field.

NOTE: Do not use this option to pad a UPC or EAN bar code.

Do not use with:	
Option	**Description**
42	Price

2. Find Option **30** on the Format Worksheet. This option defines a pad character for a field.

Make sure you write the pad character in the same row as the field to be padded.

3. Decide whether to place pad characters on the **R**ight or the **L**eft side of the field. Write **L** or **R** in box **R3**, after **30**.

4. In box **R4**, write the character to use as a pad character. Place quotation marks around the character, like this:

"0"

Check Chapter 12, "Quick References" to make sure the character is printable in the font used in this field. See Appendix C, "Printable Characters," to use special characters as the pad character.

Padding is especially useful when printing variable length bar codes in a fixed space. If the maximum number of characters in the bar code is 15, but the operator only enters 10 characters, the padding option fills the remainder of the field with pad characters.

Creating a Price Field (Option 42)

You can apply options to automatically insert monetary symbols, so the operator only needs to enter numbers.

Do not use with:	
Option	**Description**
31	Check digit
60	Incrementing

1. Define your text field on the Format Worksheet as shown in Chapter 2, "Designing a Format." Remember
   - This option is not recommended for bar codes.
   - When determining the maximum number of characters, add the maximum number of digits and the proper monetary symbols.
2. Find Option **42** on the Format Worksheet. This option turns a text field into a price field.
3. Write **1** in box **R3** after **42**. This is an appearance code for price fields.

   Make sure you enter the price code in the same row as the text field to which it applies.

The printer prints price symbols based on country settings selected on the printer. See your *Operator's Handbook* to select country settings.

OPTION #42 Price Field		
R1 HEADER	R2 CODE #	R3 APP CODE
R	42	/
R	42	
R	42	
R	42	
R	42	
R	42	
R	42	

Incrementing Fields (Option 60)

You may have an application, such as serial numbers, in which you need a numeric field to increment (increase in value) or decrement (decrease in value) on successive supplies.

Incrementing should be applied to **numeric** data only. If you have a field that includes letters and digits, apply this option only to the portion of the field that contains digits.

NOTE: This option causes some delay in printing between tickets.

1. Define your text or bar code field on the Format Worksheet as shown in Chapter 2, "Designing a Format."

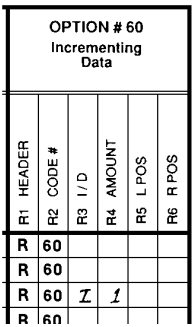
2. Find Option **60** on the Format Worksheet. This option increments fields.

   Make sure you enter the incrementing option in the same row as the field to which it applies.

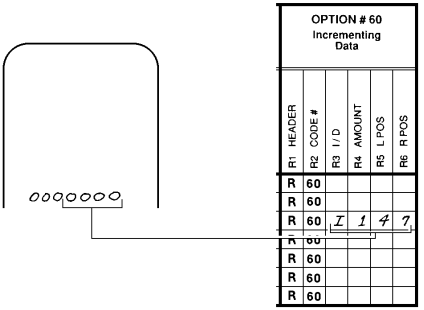
Do not use with:	
Option	**Description**
31	Check Digit
42	Price

3. In box **R3**, after **60**, place an **I** if the value will increase as you print or a **D** if the value will decrease as you print.

4. Write the amount by which the printer counts in box **R4**. For example, do you want to count by 1's, 2's, 10's, etc.? Valid options range from **1** to **32,000**.



5. In box **R5**, write the left-most position to be counted in the field. Field positions are numbered from left to right, beginning with 1.



6. In box **R6**, enter the right-most position to be counted in the field.

Entering data for incrementing fields

There are two ways to enter the first number in the incrementing sequence.

- The operator enters the first number during batch entry
- Use Option **1** to define the first number as fixed characters.

NOTE: The first number in the sequence must contain the same number of digits as the highest number to be counted. For example, to count the numbers 1 to 999, the first number in the sequence must be entered as 001.

Fixing the first number in the incrementing sequence

To enter the first number in the sequence automatically, use Option **1** to define the first number. See "Defining Fixed Data" earlier in this chapter.

4. Using Check Digits

Check digits are typically used to verify that a field is scanned correctly. You can use check digits on text or bar code fields. Do not use check digits on price fields or incrementing fields. Perform check digit calculations only on numeric data only.

You can choose whether the check digit is

- *generated* by the printer or
- entered by the operator and *verified* by the printer.

You can apply field Option **31** to generate or verify the check digit. Option **31** is explained in this chapter.

You can define your own check digit calculation scheme for other bar codes and numeric text fields. Some sample calculations are shown in this chapter.

UPC and EAN bar codes have predefined check digits. Do not define check digits for these bar codes.

Defining a Check Digit Scheme

See "Sample Check Digit Calculation" later in this chapter if you need help defining the Check Digit Scheme.

1. Make a copy of the Check Digit Record template on the following page, or the check digit worksheet in Appendix D. Use the copy for steps 2 through 7.

2. Assign a number from **1** to **9** to identify this calculation scheme. Write the number in box **A2** in the Check Digit Record.

3. Decide whether to add or clear the check digit.

   A - Add
   C - Clear.

4. Decide how the printer will store the Check Digit Record.

   R - Printer Memory
   M - Memory Card.

   Write **R** or **M** in Box **A4.**

5. Assign a number from **2** to **10** to use as a *modulus* in the check digit calculation. Write the number in box **A5**.

6. Determine how many characters will be in the fields that use this scheme, *not including the check digit*. Write the number in box **A6**. The maximum number is **29**.

7. Determine how the check digit be calculated. Write **D** for "sum of digits," or **P** for "sum of products" in box **A7.**

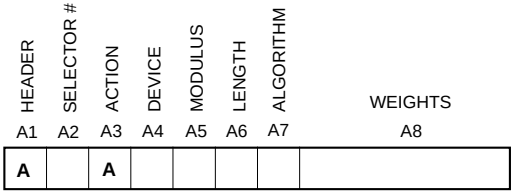
8. Determine what numbers to use as *weights* for check digit calculation. Do not include a weight for the check digit. You need a string of numbers equal in length to the number in box **A6**. Enter the string of numbers in box **A8**.

   NOTE: Use zero as a weight digit in positions containing non-numeric characters.

Place quotation marks around the string of numbers, like this

"65432"

Check Digit Record



Generating Check Digits

You can make the printer generate a check digit. This option is not necessary for UPC or EAN bar codes. The printer automatically generates a check digit for these codes.

1. Define the text or bar code field on the Format Worksheet, as shown in Chapter 2, "Designing a Format."
2. Find Option **31** on the Format Worksheet. This option is for check digits.

Do not use with:	
Option	**Description**
42	Price
60	Incrementing

3. Write **G** in box **R3**, after **31**. This tells the printer to generate a check digit. The check digit will be the last digit in the field.
4. Write the selector number of the check digit scheme (box **A2** above) in box **R4**.

NOTE: To allow for the check digit, the maximum number of characters accepted in the field will be one fewer than the maximum number in the field.

Verifying Check Digits

You can make the printer verify a check digit entered by the operator.

1. Define the text or bar code field on the Format Worksheet, as shown in Chapter 2, "Designing a Format."

Do not use with:	
Option	**Description**
42	Price
60	Incrementing

2. Find Option **31** on the Format Worksheet. This value is the option for check digits.
3. Write **V** in box **R3**, after **31**. This value tells the printer to verify a check digit. The check digit is the last digit in the field.
4. Write the selector number of the check digit scheme (box **A2**) after **G**.

Check Digit Verification on Copied Fields

The 9401/9402 printer does not verify a check digit on numeric text fields that have been copied from a previous field.

For example, a text field with field Option **4** followed by field Option **31** with the Verify option (as shown below) does not work.

```
T,2,6,V,061,010,2,2,2,1,B,L,0,0¦
R,4,1,1,6,2¦
R,31,V,5¦
```

Instead, use the following procedure:

1. Place the Verify option on the operator-entered field.
2. Copy the verified field (including formatted data) into the destination field.

Clearing a Check Digit Scheme

You can clear a check digit scheme from printer memory.

1. In the check digit record created on earlier, replace the **A** in box **A3** with a **C.**
2. Follow the instructions in Chapter 6, "Entering Data Streams," to create a file on your computer.
3. Type the values from the Check Digit Record in the file. Make sure you have a **C** in item 3.
4. Save the file.
5. Set the print mode on the printer to "Ready" (see Chapter 7, "Configuring The Printer").
6. Download the file to the printer (see Chapter 8, "Printing").

Sample Check Digit Calculation

There are two types of check digit calculations.

Sum of Products used for bar codes such as UPC-A, EAN-8, and EAN-13.

Sum of Digits an alternative to Sum of Products.

Sum of Products

1. Place numeric data in a field. Leave the check digit slot empty.

   4 3 8 2 7 C

2. Starting with the *last* digit before the check digit, assign *weights*, working right to left. Weights are a sequence of numbers the same length as the field. Digits in the field are multiplied by the weight digits to determine addends for the check digit calculation.

When assigning weights, do not use the same number throughout. Also, do not assign a weight to the check digit.

4	3	8	2	7	C
6	**5**	**4**	**3**	**2**	

3. Assign a number from **2** to **10** as the *modulus*. The modulus will be used in the check digit calculation.

Modulus = **10**

4. Multiply each digit in the field by its corresponding weight digit.

4	3	8	2	7	C
6	5	4	3	2	
24	**15**	**32**	**6**	**14**	

5. Find the sum of all the products.

24 + 15 + 32 + 6 + 14 = **91**

6. Calculate the first multiple of the modulus that is greater than the sum of the products.

10 x 10 = **100** (>91)

7. Subtract the sum of the products from this number.

100 - 91 = **9**

8. The resulting number is the check digit.

Check digit = **9**
Bar code data = 43827**9**

Sum of Digits

1. Place numeric data in a field. Leave the check digit slot empty.

4	**3**	**8**	**2**	**7**	**C**

2. Starting with the *last* digit before the check digit, assign *weights*, working right to left. Weights are a sequence of numbers the same length as the field. Digits in the field are multiplied by the weight digits to find addends for the check digit calculation.

When assigning weights, do not use the same number throughout. Do not assign a weight to the check digit.

4	3	8	2	7	C
6	**5**	**4**	**3**	**2**	

3. Assign a number from **2** to **10** as the *modulus*. The modulus will be used in the check digit calculation.

Modulus = **10**

4. Multiply each digit in the field by its corresponding weight digit.

4	3	8	2	7	C
6	5	4	3	2	
24	**15**	**32**	**6**	**14**	

5. Find the sum of all the *digits* in the products. Treat 2-digit numbers as two separate numbers. For example, add the digits in the number **24** separately as **2** and **4**.

2 + 4 + 1 + 5 + 3 + 2 + 6 + 1 + 4 = **28**

6. Calculate the first multiple of the modulus that is greater than the sum of the digits.

10 x 3 = **30** (>28)

7. Subtract the sum of the digits from this number.

30 - 28 = **2**

8. The resulting number is the check digit.

Check digit = **2**
Bar code data = 43827**2**

4. Using Check Digits

Check digits are typically used to verify that a field is scanned correctly. You can use check digits on text or bar code fields. Do not use check digits on price fields or incrementing fields. Perform check digit calculations only on numeric data only.

You can choose whether the check digit is

- *generated* by the printer or
- entered by the operator and *verified* by the printer.

You can apply field Option **31** to generate or verify the check digit. Option **31** is explained in this chapter.

You can define your own check digit calculation scheme for other bar codes and numeric text fields. Some sample calculations are shown in this chapter.

UPC and EAN bar codes have predefined check digits. Do not define check digits for these bar codes.

Defining a Check Digit Scheme

See "Sample Check Digit Calculation" later in this chapter if you need help defining the Check Digit Scheme.

1. Make a copy of the Check Digit Record template on the following page, or the check digit worksheet in Appendix D. Use the copy for steps 2 through 7.

2. Assign a number from **1** to **9** to identify this calculation scheme. Write the number in box **A2** in the Check Digit Record.

3. Decide whether to add or clear the check digit.

   A - Add
   C - Clear.

4. Decide how the printer will store the Check Digit Record.

   R - Printer Memory
   M - Memory Card.

   Write **R** or **M** in Box **A4.**

5. Assign a number from **2** to **10** to use as a *modulus* in the check digit calculation. Write the number in box **A5**.

6. Determine how many characters will be in the fields that use this scheme, *not including the check digit*. Write the number in box **A6**. The maximum number is **29**.

7. Determine how the check digit be calculated. Write **D** for "sum of digits," or **P** for "sum of products" in box **A7.**

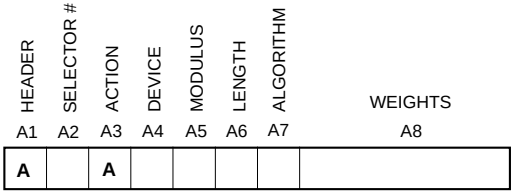
8. Determine what numbers to use as *weights* for check digit calculation. Do not include a weight for the check digit. You need a string of numbers equal in length to the number in box **A6**. Enter the string of numbers in box **A8**.

   NOTE: Use zero as a weight digit in positions containing non-numeric characters.

Place quotation marks around the string of numbers, like this

"65432"

Check Digit Record



Generating Check Digits

You can make the printer generate a check digit. This option is not necessary for UPC or EAN bar codes. The printer automatically generates a check digit for these codes.

1. Define the text or bar code field on the Format Worksheet, as shown in Chapter 2, "Designing a Format."
2. Find Option **31** on the Format Worksheet. This option is for check digits.

Do not use with:	
Option	**Description**
42	Price
60	Incrementing

3. Write **G** in box **R3**, after **31**. This tells the printer to generate a check digit. The check digit will be the last digit in the field.
4. Write the selector number of the check digit scheme (box **A2** above) in box **R4**.

NOTE: To allow for the check digit, the maximum number of characters accepted in the field will be one fewer than the maximum number in the field.

Verifying Check Digits

You can make the printer verify a check digit entered by the operator.

1. Define the text or bar code field on the Format Worksheet, as shown in Chapter 2, "Designing a Format."

Do not use with:	
Option	**Description**
42	Price
60	Incrementing

2. Find Option **31** on the Format Worksheet. This value is the option for check digits.
3. Write **V** in box **R3**, after **31**. This value tells the printer to verify a check digit. The check digit is the last digit in the field.
4. Write the selector number of the check digit scheme (box **A2**) after **G**.

Check Digit Verification on Copied Fields

The 9401/9402 printer does not verify a check digit on numeric text fields that have been copied from a previous field.

For example, a text field with field Option **4** followed by field Option **31** with the Verify option (as shown below) does not work.

```
T,2,6,V,061,010,2,2,2,1,B,L,0,0¦
R,4,1,1,6,2¦
R,31,V,5¦
```

Instead, use the following procedure:

1. Place the Verify option on the operator-entered field.
2. Copy the verified field (including formatted data) into the destination field.

Clearing a Check Digit Scheme

You can clear a check digit scheme from printer memory.

1. In the check digit record created on earlier, replace the **A** in box **A3** with a **C.**
2. Follow the instructions in Chapter 6, "Entering Data Streams," to create a file on your computer.
3. Type the values from the Check Digit Record in the file. Make sure you have a **C** in item 3.
4. Save the file.
5. Set the print mode on the printer to "Ready" (see Chapter 7, "Configuring The Printer").
6. Download the file to the printer (see Chapter 8, "Printing").

Sample Check Digit Calculation

There are two types of check digit calculations.

Sum of Products used for bar codes such as UPC-A, EAN-8, and EAN-13.

Sum of Digits an alternative to Sum of Products.

Sum of Products

1. Place numeric data in a field. Leave the check digit slot empty.

   4 3 8 2 7 C

2. Starting with the *last* digit before the check digit, assign *weights*, working right to left. Weights are a sequence of numbers the same length as the field. Digits in the field are multiplied by the weight digits to determine addends for the check digit calculation.

When assigning weights, do not use the same number throughout. Also, do not assign a weight to the check digit.

4	3	8	2	7	C
6	**5**	**4**	**3**	**2**	

3. Assign a number from **2** to **10** as the *modulus*. The modulus will be used in the check digit calculation.

Modulus = **10**

4. Multiply each digit in the field by its corresponding weight digit.

4	3	8	2	7	C
6	5	4	3	2	
24	**15**	**32**	**6**	**14**	

5. Find the sum of all the products.

24 + 15 + 32 + 6 + 14 = **91**

6. Calculate the first multiple of the modulus that is greater than the sum of the products.

10 x 10 = **100** (>91)

7. Subtract the sum of the products from this number.

100 - 91 = **9**

8. The resulting number is the check digit.

Check digit = **9**
Bar code data = 43827**9**

Sum of Digits

1. Place numeric data in a field. Leave the check digit slot empty.

4	**3**	**8**	**2**	**7**	**C**

2. Starting with the *last* digit before the check digit, assign *weights*, working right to left. Weights are a sequence of numbers the same length as the field. Digits in the field are multiplied by the weight digits to find addends for the check digit calculation.

When assigning weights, do not use the same number throughout. Do not assign a weight to the check digit.

4	3	8	2	7	C
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Modulus = **10**

4. Multiply each digit in the field by its corresponding weight digit.

4	3	8	2	7	C
6	5	4	3	2	
24	**15**	**32**	**6**	**14**	

5. Find the sum of all the *digits* in the products. Treat 2-digit numbers as two separate numbers. For example, add the digits in the number **24** separately as **2** and **4**.

2 + 4 + 1 + 5 + 3 + 2 + 6 + 1 + 4 = **28**

6. Calculate the first multiple of the modulus that is greater than the sum of the digits.

10 x 3 = **30** (>28)

7. Subtract the sum of the digits from this number.

30 - 28 = **2**

8. The resulting number is the check digit.

Check digit = **2**
Bar code data = 43827**2**

5. Recording Batch Information

Batch data is the actual information printed on the supply. The operator fills in the "slots" in the format with the information to be printed, such as a price or a serial number.

There are three ways to enter batch data into the printer.

- using the 21-key keypad
- using an optional computer keyboard plugged into the printer
- downloading from a computer.

To enter batch data from the 21-key keypad or an optional computer keyboard, follow instructions in the *Operator's Handbook* for entering batch data.

If you want to send batch data to the printer from a computer, read this chapter.

Preparing Batches for Downloading

A batch to be downloaded consists of two parts.

- **Batch Header** Identifies the format to use for the batch and how many supplies to print.
- **Batch Data** The actual information to print on the supply.

Make a copy of the batch worksheet in Appendix D, "Format Design Tools." Use the copy to record batch information.

1. Fill in the Batch Header section.

- All formats have a number (see box **F2** on the Format Worksheet). Select the number of the format to use for this batch. Enter the format number in box **B2** in the Batch Header section.

If you want to use one of the standard formats, the format numbers are

Format	Number
FMT - 1	96
FMT - 2	97
FMT - 3	98

NOTE: If you have optional formats, see Appendix A, "Optional Formats," for format numbers.

- You can select how you want to fill in printed fields. Choose **N** or **U** from the list below, and write it in box **B3** in the Batch Header section.

  N New. When selecting this option, enter the printing information for all fields.

  U Update. If you printed a batch just before this batch, and many fields are the same, you may want to use this option. Only fill in the fields that changed from the last printed batch to this one.

- Decide how many supplies you want to print in each batch. Write a number from **1** to **9999** in box **B4** in the Batch Header section.

2. Fill in the Batch Data section.

- The **Field #** boxes list field numbers, from 1 to 14. In the **Data** box, write the information you want printed in that field. If using the **N** option in the Batch Header, you must list **all** fields, including fixed and copied fields, in sequence.

Fields with Fixed Characters

- If a field contains only fixed characters, place quotation marks, with no space in the quotes, in the second box, like this:

  ""

- If a field has some, but not all fixed characters, send data only for characters that are not fixed.

Merged or sub-fields

- If a field is completely filled by data copied from other fields, place quotation marks in the **Data** box, as shown above.

Incrementing fields

- In incrementing fields, the first number in the sequence must contain the same number of digits as the highest number to be counted. For example, to count the numbers 1 to 999, enter 001.

3. See Chapter 6, "Entering Data Streams," to enter this information on a computer.

Batch Worksheet

	HEADER	FORMAT #	NEW / UPDATE	QUANTITY
	B1	B2	B3	B4
Batch Header	**B**			

Batch Data

Field #	Data
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	

Guidelines for Preparing Batch Data

When entering batch data, keep in mind the following guidelines.

Guideline 1

When creating batch packets for downloading, be sure each batch data record conforms with its field definition.

For example, the following field is defined with a maximum of four characters. The batch record contains six characters.

```
{F,20,A,R,E,100,200,"SAMPLE" ¦
 T,1,4,V,061,010,2,2,2,1,B,L,0,0 ¦     max. 4 characters
 . . .}
{B,20,N,10 ¦
 1,"ABCDEF" ¦                          6 char. batch data
```

In this case, only the first four characters will print.

Guideline 2

Be aware of how field options impact the field.

For example, the following field has a price field option. The field has a maximum of five characters. The batch record contains six characters.

```
{F,21,A,R,E,100,200,"PRICE" ¦
 T,1,5,V,061,010,2,2,2,1,B,L,0,0 ¦     max. 5 characters
 R,42,1 ¦                              price option
 . . .}
{B,21,N,10 ¦
 1,"129999" ¦                          6 char. batch data
```

Since the price option adds 2 characters, this field will print as $129., dropping the last 3 characters of data and cutting the price from $1299.99 to $129.

6. Entering Data Streams

You must use a computer to enter formats into the printer. This chapter explains how to transfer the format information from your Format Worksheet to a computer file. Later, you will learn how to send formats to the printer from the computer (see Chapter 8, "Printing").

Chapter 11, "Online Information," provides syntax and online information for this printer. Programmers may wish to refer to Chapter 11 to create and transmit data streams.

You will need these items.

- a completed Format Worksheet
- a computer terminal
- an ASCII line editor or word processor.*

NOTE: If you use a word processor to create this file, be sure to create the file in "non-document" or unformatted ASCII mode.

* *You can use Monarch 2095™ Printing System software to create formats for your 9401/9402 printer. Contact your Monarch representative for more information.*

The examples shown in this chapter use a MS-DOS computer system.

Creating Format Files

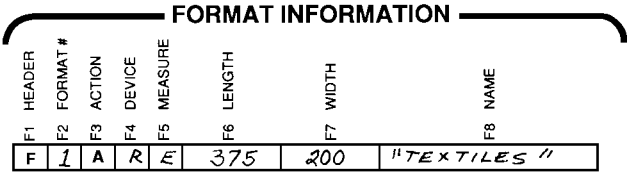
Format files contain these types of records.

- Format header
- Text fields
- Non-printable text fields
- Bar code fields
- Field options
- Constant text overlays
- Lines and/or boxes.

1. Using an ASCII text editor, create a file to hold your format information.

2. Place a left brace **{** on line 1. Go to the next line. Do not put a space after the brace.

3. Find the Format Header on the Format Worksheet.



Type all values from boxes **F1** through **F8** on line 2 in your file as follows.

- Place the **F** from box **F1** at the very beginning of the line. Do not place a space or any other character before the **F**.
- Enter all information in capital letters (except phrases in quotes).
- Place commas between all values.
- Make sure you have **8** items in line 2.
- Do not forget the double quotes around item **8**.
- Place a split vertical bar ¦ at the end of line 2.

- Go to the next line after the split vertical bar.
- So far, your file should look something like this.

```
{
F,1,A,R,E,375,200,"Textiles" ¦
```

4. Find the text, non-printable text, or bar code field with field number **1** (box T2, D2, or B2).

Use step 5, 6, or 7 (that follow) to type your field definitions in the computer file. Enter all records in the computer file **in order by field number**, regardless of the field type.

Entering Text Fields

5. Type all values from boxes **T1** through **T14** on one line in your file. Refer to the Text Field section of the Format Worksheet.

T1 HEADER	T2 FIELD #	T3 # OF CHAR.	T4 FIX/VAR	T5 ROW	T6 COLUMN	T7 GAP	T8 FONT	T9 HGT. MAG.	T10 WID. MAG.	T11 COLOR	T12 ALIGNMENT	T13 CHAR. ROT.	T14 FIELD ROT.
T	1	10	V	250	50	0	1	1	1	B	C	0	0
T													

Remember

- Enter all values, starting with the **T** in box **T1**.
- Enter all information in capital letters (except phrases in quotes).
- Place commas between all values.
- Make sure you have **14** items on the line.
- Make sure all fields -- text, non-printable text, and bar code -- are in order by field number (item #2).
- Place a split vertical bar ¦ after item #14.
- Go to a new line after the vertical bar.

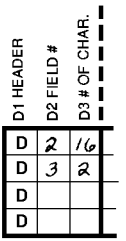
If you are applying any field options to this field, follow the instructions in step 11 to insert field options after the text field.

If field #1 is a text field, your file should look something like this.

```
{
F,1,A,R,E,300,200,"Textiles"¦
T,1,10,V,250,50,0,1,1,1,B,C,0,0¦
```

Entering Non-Printable Text Fields

6. Refer to the Non-Printable Text Field section of the format worksheet. Type all values from boxes D1 through D3.



Remember

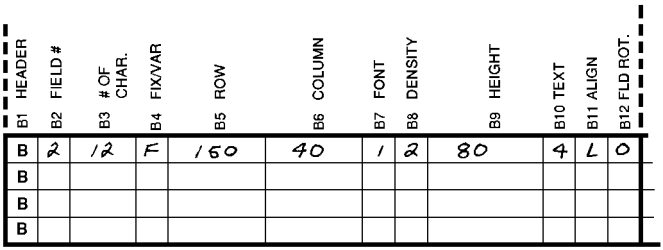
- Enter all values, starting with the D in box D1.
- Enter all information in CAPITAL letters (except phrases in quotes).
- Place a comma between all values.
- Make sure you have 3 items.
- Make sure all fields -- text, non-printable text, and bar code -- are in order by field number (item #2).
- Place a split vertical bar ¦ after item #3.
- Go to a new line after the vertical bar.
- Follow the instructions in step 11 if applying options to the field.

If fields #2 and #3 are non-printable text fields, your file should now look like this.

```
{
F,1,A,R,E,300,200,"Textiles" ¦
T,10,V,250,50,0,1,1,1,B,C,0,0 ¦
D,2,16 ¦
D,3,2 ¦
```

Entering Bar Code Fields

7. Type all values from boxes **B1** through **B12**. Refer to the Bar Code Fields section of the Format Worksheet.



B1 HEADER	B2 FIELD #	B3 # OF CHAR.	B4 FIX/VAR	B5 ROW	B6 COLUMN	B7 FONT	B8 DENSITY	B9 HEIGHT	B10 TEXT	B11 ALIGN	B12 FLD ROT.
B	2	12	F	160	40	1	2	80	4	L	0
B											
B											
B											

Remember

- Enter all values, starting with the **B** in box **B1**.
- Enter all information in capital letters
- Place a comma between all values.
- Make sure you have **12** items.
- Make sure all fields -- text, non-printable text, and bar code -- are in order by field number (item #2).
- Place a split vertical bar ¦ after item #12.
- Go to a new line after the vertical bar.

If you are applying field options to this field, follow the instructions in step 11 to insert options after the bar code field.

If field #4 is a bar code, your file should now look like this.

```
{
F,1,A,R,E,300,200,"Textiles" ¦
T,1,10,V,250,50,0,1,1,1,B,C,0,0 ¦
B,2,12,F,150,40,1,2,80,4,L,0 ¦
```

Entering Constant Text Overlays

8. Type all values from boxes **C1** through **C12** on one line in your file. Refer to the Constant Text section of the Format Worksheet.

C1 HEADER	C2 ROW	C3 COLUMN	C4 GAP	C5 FONT	C6 HGT. MAG.	C7 WID. MAG.	C8 COLOR	C9 ALIGNMENT	C10 CHAR. ROT.	C11 FIELD ROT.	C12 FIXED CHAR. ("IN QUOTES")
C	30	10	0	1	1	1	B	L	0	0	"MADE IN USA"
C											

Remember

- Enter all values, starting with the **C** in box **C1**.
- Enter all information in capital letters (except phrases in quotes).
- Place a comma between all values.
- Make sure you have **12** items on the line.
- Place a split vertical bar ¦ after item #12.
- Go to a new line after the vertical bar.

A Constant Text Overlay in your file would look something like this.

```
{
F,1,A,R,E,300,200,"Textiles" ¦
T,1,10,V,250,50,0,1,1,1,B,C,0,0 ¦
B,2,12,F,150,40,1,2,80,4,L,0 ¦
T,3,20,V,80,10,0,1,1,1,B,L,0,0 ¦
T,4,20,V,65,10,0,1,1,1,B,L,0,0 ¦
C,30,10,0,1,1,1,B,L,0,0,"Made In USA"¦
```


Entering Lines

9. Type all values from boxes **L1** through **L8**. Refer to the Lines section of the Format Worksheet.

L1 HEADER	L2 TYPE	L3 ROW	L4 COLUMN	L5 ANGLE/ END ROW	L6 LENGTH/ END COL.	L7 THICKNESS	L8 PATTERN
L	S	110	30	110	150	10	" "
L							
L							
L							

Remember

- Enter all values, starting with the **L** in box **L1**.
- Enter all information in capital letters.
- Place a comma between all values.
- Make sure you have **8** items.
- Do not put a space or any other character in the quotation marks in item 8.
- Place a split vertical bar ¦ after item #8.
- Go to a new line after the vertical bar.

A line record should look something like this.

```
{
F,1,A,R,E,300,200,"Textiles" ¦
T,1,10,V,250,50,0,1,1,1,B,C,0,0 ¦
B,2,12,F,150,40,1,2,80,4,L,0 ¦
T,3,20,V,80,10,0,1,1,1,B,L,0,0 ¦
T,4,20,V,65,10,0,1,1,1,B,L,0,0 ¦
C,30,10,0,1,1,1,B,L,0,0,"Made In USA"¦
L,S,110,30,110,150,10,"" ¦
```

Entering Boxes

10. Type all values from boxes **Q1** through **Q7**. Refer to the Boxes section of the Format Worksheet.

	Q1 HEADER	Q2 ROW	Q3 COLUMN	Q4 END ROW	Q5 END COLUMN	Q6 THICKNESS	Q7 PATTERN
Q		240	30	270	150	3	" "
Q							
Q							
Q							

Remember

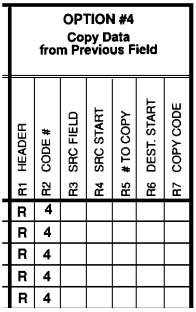
- Enter all values, starting with the **Q** in box **Q1**.
- Enter all information in capital letters.
- Place a comma between all values.
- Make sure you have **7** items.
- Do not put a space or any other character in the quotation marks in item #7.
- Place a split vertical bar ¦ after item #7.
- Go to a new line after the vertical bar.

Your file should look something like this.

```
{
F,1,A,R,E,300,200,"Textiles" ¦
T,1,10,V,250,50,0,1,1,1,B,C,0,0 ¦
B,2,12,F,150,40,1,2,80,4,L,0 ¦
T,3,20,V,80,10,0,1,1,1,B,L,0,0 ¦
T,4,20,V,65,10,0,1,1,1,B,L,0,0 ¦
C,30,10,0,1,1,1,B,L,0,0,"Made In USA"¦
L,S,110,30,110,150,10,"" ¦
Q,240,30,270,150,3,"" ¦
```


Applying Field Options

11. If you are applying options to any field, remember the following:



- Insert a line directly after the text or bar code field to which the option applies. **Options must immediately follow the field to which they apply.**
- Find all options on the same row of the worksheet as the field.
- Type the values for each option on separate lines following the text or bar code field. For example, begin with the first box **R1** on the first line after the field. The next applicable box **R1** would go on a new line.
- Enter all information in capital letters (except phrases in quotes).
- Make sure all items are separated by commas.
- Make sure the number of items on each line matches the number of items shown on the Format Worksheet for each option.
- Place a split vertical bar ¦ at the end of each line.

Refer to the Field Options section of the Format Worksheet and Chapter 3, "Applying Field Options."

Your file should look something like this

```
{
F,1,A,R,E,300,200,"Textiles" ¦
T,1,10,V,250,50,0,1,1,1,B,C,0,0 ¦
B,2,12,F,150,40,1,2,80,4,L,0 ¦
T,3,20,V,80,10,0,1,1,1,B,L,0,0 ¦
T,4,20,V,65,10,0,1,1,1,B,L,0,0 ¦
C,30,10,0,1,1,1,B,L,0,0,"Made In USA" ¦
L,S,110,30,110,150,10,"" ¦
Q,240,30,270,150,3,"" ¦
```

12. Place a right brace **}** at the end of the file.

Your file should look something like this.

```
{
F,1,A,R,E,300,200,"Textiles" ¦
T,1,10,V,250,50,0,1,1,1,B,C,0,0 ¦
B,2,12,F,150,40,1,2,80,4,L,0 ¦
T,3,20,V,80,10,0,1,1,1,B,L,0,0 ¦
T,4,20,V,65,10,0,1,1,1,B,L,0,0 ¦
C,30,10,0,1,1,1,B,L,0,0,"Made In USA"¦
L,S,110,30,110,150,10,"" ¦
Q,240,30,270,150,3,"" ¦  }
```

A sample format file is shown on the next page.

Sample Format File

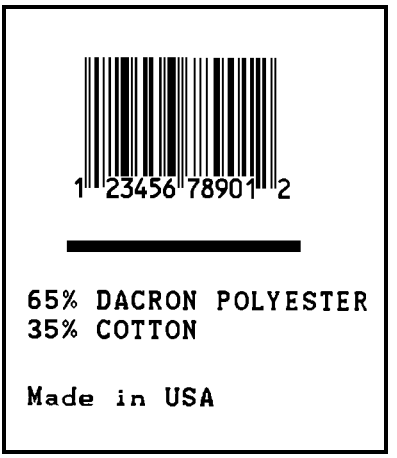
```
{
F,1,A,R,E,300,200,"Textiles" ¦                    Format Header
T,1,10,V,250,50,0,1,1,1,B,C,0,0 ¦                 Field #1, text field
R,20,"Part Number:" ¦                             Prompt for field #1
B,2,12,F,150,40,1,2,80,4,L,0 ¦                    Field #2, UPC bar code
R,20,"UPC Number:" ¦                              Prompt  for field #2
D,3,20 ¦                                          Field #3, non-printable text field
R,20,"Fiber #1:" ¦                                Prompt for field #3
D,4,2 ¦                                           Field #4, non-printable text field
R,20,"Percentage:" ¦                              Prompt for field #4
T,5,24,V,80,0,1,1,1,B,L,0,0 ¦                     Field #5, text, merge fields 3 and 4
R,1,"--% --------------------" ¦                  Fixes character "%" in position 3
R,4,4,1,2,1,1 ¦                                   Copies field #4 into position 1
R,4,3,1,20,5,1 ¦                                  Copies field #3 into position 5
R,5,N ¦                                           Eliminates user prompt
D,6,20 ¦                                          Field #6, non-printable text field
R,20,"Fiber #2:" ¦                                Prompt for field #6
D,7,2 ¦                                           Field #7, non printable text field
R,20,"Percentage:" ¦                              Prompt for field #7
T,8,24,V,65,10,0,1,1,1,B,L,0,0 ¦                  Field #8, text, merge fields 6 and 7
R,1,"--% -------------------- ¦                   Fixes character "%" in position 3
R,4,7,1,2,1,1 ¦                                   Copies field #7 into position 1
R,4,6,1,20,5,1 ¦                                  Copies field #6 into position 5
R,5,N ¦                                           Eliminates user prompt
C,30,10,0,1,1,1,B,L,0,0,"Made In USA" ¦           Fixes text "Made In USA"
L,S,110,30,110,150,10,"" ¦                        Line between bar code and text
Q,240,30,270,150,3,"" ¦                           Box around field #1
}
```

Sample Format Batch File

```
{
B,1,N,5 ¦
1, "2754185285" ¦
2, "74185245768" ¦
3, "65" ¦
4, "DACRON POLYESTER" ¦
6, "35" ¦
7, "COTTON" ¦
}
```

The sample Format Worksheet in Appendix D shows the format file as it appears on the worksheet.

This sample tag was created with these formats.



Creating Check Digit Files

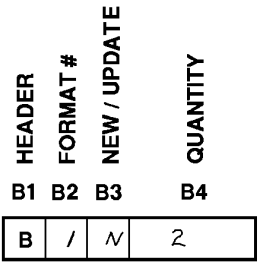
1. Using an ASCII text editor, create a file to hold your check digit calculation scheme.
2. Place a left brace **{** on line 1. Go to the next line.
3. Find the Check Digit record you created in Chapter 4.
4. Type all values from boxes **A1** through **A8** on line 2 in your file as follows.
   - Place the **A** from box **A1** at the very beginning of the line. Do not place a space or any other character before the **A**.
   - Enter all information in capital letters (except phrases in quotes).
   - Place a comma between all values.
   - Make sure you have **8** items in line 2.
   - Do not forget the quotation marks around item #8.
   - Place a split vertical bar ¦ at the end of line 2.
5. Go to the next line after the split vertical bar. Place a right brace **}** on that line to end the check digit file.

Your file should look something like this.

```
{
A,1,A,M,10,5,D,"65432" ¦ }
```

Creating Batch Data Files

1. Using an ASCII text editor, create a file to hold your batch information.
2. Place a left brace **{** on line 1. Go to the next line.
3. Refer to the Batch Header section of the Batch Worksheet.



4. Type all values from boxes **B1** through **B4** on line 2 in your file as follows.

   - Place the **B** from box **B1** at the very beginning of the line. Do not place a space or any other character before the **B**.
   - Enter all information in capital letters.
   - Place a comma between all values.
   - Make sure you have **4** items in line 2.
   - Place a split vertical bar ¦ at the end of line 2.
   - Go to the next line after the split vertical bar.

5. Refer to the Batch Data section of the Batch Worksheet.

```
{
B,1,N,2 ¦
```

Field #	Data
1	"0435419970"
2	"12345678901"

6. Enter each Batch Data record on a separate line, as follows.

- Type the field number, followed by a comma.
- Type the field data. Place quotation marks around the word or phrase.
- Type a line for all fields for fixed or copied fields. Enter only quotation marks.
- Place a split vertical bar ¦ after the field data.
- Go to a new line and enter the next field the same way.

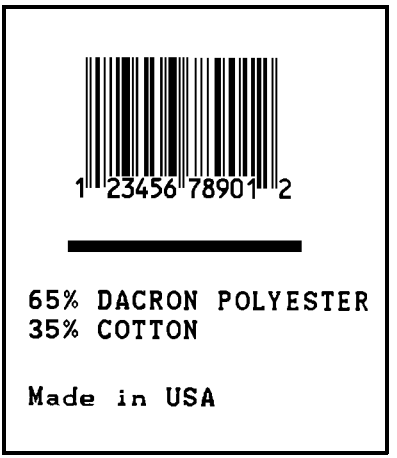
Your file should look something like this.

```
{
B,1,N,2 ¦  1,"0435419970" ¦
2,"12345678901" ¦  3,"65% DACRON
POLYESTER" ¦  4,"35% COTTON" ¦
```

7. After entering the last field, go to the next line. Place a right brace **}** on that line to end the Batch Data file.

```
{
B,1,N,2 ¦ 1,"0435419970" ¦
2,"12345678901" ¦ 3,"65% DACRON
POLYESTER" ¦ 4,"35% COTTON" ¦ }
```

The printed label looks like this.



8. The format, check digit, and batch data are now ready to send to the printer. Continue with Chapter 7, "Configuring the Printer," to set up the printer, then with Chapter 8, "Printing," to print batches.

7. Configuring the Printer

The printer must be properly configured before you can print.

Connecting the Printer

Consult your *Equipment Manual* to connect your printer to a computer.

Online Communication Requirements

The 9401 and 9402 printers come equipped with a 9-pin RS-232 communications port for online operation. See "Cable Interface" at the end of this chapter for pin assignments.

You need to set the printer's communication values to match the values at the host.

You must define five values to ensure reliable communication between the printer and the host. The values and selectable options are listed below.

Option	Values	Default
Baud rate	9600, 4800, 2400, 1200	2400
Word length	Seven (7), eight (8)	Eight (8)
Stop bits	One (1), two (2)	One (1)
Parity	None, Odd, Even	(None)
Flow control	None, Xon/Xoff, DTR	DTR

Refer to the definitions on the next page if you need assistance determining communication settings.

Communication Values - Definitions

Baud Rate

The baud rate is the speed, measured in bits per second, at which the printer sends or receives data. A commonly used baud rate for RS-232 communications is 2400 bits per second.

Word Length

Word Length specifies the number of bits the printer uses to define a character. The 9401 and 9402 printers accept a setting of 7 or 8 bit data, but do not use the high-order bit for data.

Stop Bits

A stop bit follows the data and parity bits to signal the end of a character.

Parity

Parity is a means of checking the validity of data entering the printer. The parity bit immediately follows the last data bit for a character. The computer adjusts the parity bit according to the parity so the data bits in the character, combined with the parity bit, form an odd or even number of high bits.

Data Flow Control

Data flow control is the means by which the printer tells the computer whether it is ready to accept data. DTR (Data Terminal Ready) flow control is most commonly used with an IBM-PC™ unless the PC has a special Xon-Xoff program.

In DTR mode, the printer activates DTR when it is ready to accept data from the host and deactivates DTR when its receive buffer is nearly full.

In Xon-Xoff mode, the printer sends the Xon character when it is ready to receive data and sends the Xoff character when its buffer is nearly full. The Xon character is 17. The Xoff character is 19.

Setting Communication Values

Set communication values at the printer and the computer.

At the Printer

First, turn the printer **On** and go to the Main menu. Press ← or → until SETUP appears. Press Enter. Continue with the steps below to set communication values.

When you see	Do this
SETUP Supply	Press → until you see Port Settings. Press Enter.
PORT SETTINGS User Comm	Press Enter. You will see the first communication value.
USER COMM Baud Rate	Press Enter to set the baud rate.
BAUD RATE 2400	Press ← or → until your desired baud rate appears. Press Enter.
USER COMM Baud Rate	Press → until Word Length appears.
USER COMM Word Length	Press Enter to set the word length.
WORD LENGTH 8	Press ← or → until desired word length appears. Press Enter.
USER COMM Word Length	Press → to display Stop Bits.

USER COMM Stop Bits	Press Enter to set stop bits.
STOP BITS 1	Press ← or → until desired stop bits setting appears. Press Enter .
USER COMM Stop Bits	Press → to display Parity.
USER COMM Parity	Press Enter to set the parity.
PARITY None	Press ← or → until desired parity appears. Press Enter .
USER COMM Parity	Press → to display Flow Control.
USER COMM Flow Control	Press Enter to set flow control.
FLOW CONTROL DTR	Press ← or → until desired flow control appears. Press Enter . **NOTE:** Flow control must be set to DTR for IBM PC-compatible equipment.
USER COMM Flow Control	Press and hold Esc to return to the Main menu.

At the Computer

On IBM-PC/MS-DOS computers, use the Mode command to set communication values.

Example: **`MODE COM1:2400,N,8,1,P`**

This command sets these communication values for a printer connected to COM port 1.

- 2400 baud
- No parity
- 8 bit word length
- 1 stop bit
- P means to ignore the timeout signal, ensuring that large files will be sent in entirety.

Consult your DOS manual for more information on setting communication values on a PC system.

Consult your operating system manual or a system administrator to set communications values on other systems.

Cable Interface

This printer is equipped with a 9-pin RS-232 connector. The printer accepts standard RS-232C electrical signal transmissions when it is connected to a DB-9S connector.

Here are the pin assignments for the connector.

Pin	Description	
2	Received data	Input
8	Clear to send	
6	Data set ready	
1	Data carrier detect	
3	Transmitted data	Output
7	Request to send	
4	Data terminal ready	
Shield	Protective ground	Ground
5	Signal ground	
9	N/C	

8. Printing

Complete these tasks before you print.

- Be sure your desired format exists (Chapters 2, "Designing a Format" and Chapter 3, "Applying Field Options").
- Make sure you have the correct batch data (Chapter 5, "Recording Batch Information").
- Make sure format, check digit, and batch data are correctly entered in ASCII format (Chapter 6, "Entering Data Streams").
- Make sure the printer and computer are connected (Chapter 7, "Configuring the Printer").
- Check the communication values at the computer and the printer (Chapter 7, "Configuring the Printer").

Placing the Printer Online

1. Turn the printer **On**.
2. Press and hold Esc to go to the Main menu.
3. Press ← or → until you see Print Mode.
4. Press Enter when you see Print Mode. The printer displays

   ```
   PRINT MODE
   Ready
   ```

   You are now ready to download data to the printer.

Downloading

When downloading data, always place information in this order.

1. Check digit files
2. Format files
3. Batch data files

You need to send only a check digit file if a format following it uses the check digit scheme. Once you send a check digit file, it stays in the printer until you turn the printer **Off**.

The maximum number of formats that you can download to the printer at one time is six. This number is also the maximum that you can store in RAM at one time.

Also, the printer can hold no more than 16 packets. When the printer receives its sixteenth packet, you will not be able to use any of the first fifteen packets. If this happens, you will have to restart the printer and download the packets again, following the storage restrictions.

Downloading from a MS-DOS System

1. Find out which computer port the printer is connected to.

2. Make sure the printer display says "Print Mode - Ready."

3. Run a Mode command, if necessary, to set communication values. For example, if the printer is connected to COM1, this command matches the printer's default settings.

```
MODE COM1:2400,N,8,1,P
```

4. If you are downloading to a memory card, make sure the correct card is inserted in the printer and the write protect is **Off**. Refer to your memory card instructions.

5. Use a standard DOS command to transmit data to the printer. For example

```
COPY LABEL1.FMT COM1
```

This command transmits a file called "LABEL1.FMT" to COM1.

Downloading from Other Computer Systems

Consult your system Operations Manual or administrator for procedures to transmit data from your computer system.

Format Tracking

You create formats on your PC and download them to your printer when you are ready to use them. The 9401 printer stores formats in RAM, its receive buffer, and on memory cards.

Restrictions Each format has a number. This number enables the printer to track it. However, there are restrictions on the duplication of these numbers.

Download Duplications. If you download a format with a number that is the same as an already-stored format, the printer erases the already-stored format.

This erasure occurs no matter what device the format exists on. For example, if the memory card contains format 20, and you download another format 20 to RAM, the printer still erases the memory card's format.

To avoid the erasure, either remove the memory card before downloading the new format or change the number of the new format.

Memory Card Duplications. Before you insert a memory card, ensure that the format numbers on the card do not duplicate any format numbers in RAM.

A duplicate condition will cause you to be unable to use the duplicate format on the memory card.

To avoid this occurrence, check the formats in RAM before inserting the memory card. If a format in RAM has the same number, clear the format from RAM before inserting the memory card.

Determining the Number of Formats

To determine the number of formats currently stored in the printer, follow this procedure

1. Press and hold Esc to go to the Main menu.
2. Press ← or → until you see Format.
3. Press Enter .
4. Press ← or → until you see Temporary.
5. Press Enter .
6. At this point, one of two items appears on the printer display

```
No formats!
Press Enter.
```

- OR -

You will see a format name. If you see a format name, press ← or → to scroll through the formats. If there are six or more formats, clear one or more of them before downloading any more formats.

Clearing Formats

To clear a format, send the printer a packet in the form of {F,#,C,R¦}, where # is the number of the format to clear.

Printing Batches

In order to print a batch, the format must be in the printer.

You can download batch data files from a computer, or you can enter batch data directly at the printer, if you have the 21-key keypad or optional computer keyboard.

Batch Downloading

If you are printing a batch using one of the standard formats supplied with the printer, transmit the batch data file like this.

```
COPY LABEL1.BCH COM1
```

If you are printing a batch using a format you defined, send the format data first, followed by the batch data.

```
COPY LABEL1.FMT COM1
COPY LABEL1.BCH COM1
```

Keypad Batch Entry

If you are using the keypad or optional computer keyboard to enter batch data for one of the standard formats supplied with the printer, follow the instructions in the *Operator's Handbook.*

Perform the following steps, using the keypad and a downloaded format

1. Download the format file, using procedures on the previous page.
2. Enter batch data, using instructions in the *Operator's Handbook.*

Printer Storage Capacity

The printer has 12K of memory to hold downloaded data. This includes

- formats
- batches
- check digits
- graphics.

Formats

The printer can store up to six moderate size downloaded formats in RAM. A moderate size format is about 800 characters.

However, sometimes you may receive error code 500, meaning that the format sent to the printer does not fit in the current format buffer (2000 bytes). If you receive this error code, reduce the size of the format and send it again.

Some printers are equipped with optional formats. Optional ROM can contain up to 16 packets.

Batches

The printer can store up to three batches at one time. Batches are printed in the order in which they are received and deleted after printing.

Check Digits

The printer will store up to six check digit files. Check digits and formats in RAM are stored until

- the printer is turned **Off**
- the check digit or format is deleted by the operator
- the check digit or format packet is overwritten by a new packet with the same number.

You can determine the amount of memory available at any time with the *Device Memory Usage* diagnostic function. See Chapter 13, "Diagnostics," for instructions.

9. Editing and Reviewing Formats

You may need to edit formats after you have created them. You cannot modify or delete formats supplied with the printer.

Modifying Formats

You cannot modify a format while it is stored in the printer. Store your formats on your computer and modify them as necessary with your text editor or word processor.

Send the format to the printer again if you modify it.

NOTE: If using a word processor, be sure to edit all formats in unformatted ASCII or non-document mode.

If you delete fields or add fields to a format, remember to renumber all fields.

Deleting a Format from the Printer

You can delete a *downloaded* or *memory card* format using printer menus or a host. Memory card formats are available only on printers equipped with an optional memory card.

Using Printer Menus

Refer to your *Operator's Handbook* to delete a format using printer menus.

From a Host

1. Verify the format number you want to delete.
2. Follow the instructions in Chapter 6, "Entering Data Streams," to create a file on your computer. The file should look like this.

```
{
F,#,C,device
}
```

F A constant indicating the packet is a format header.

The number of the format to delete.

C A constant indicating to clear the format.

device The code for the device where the format is stored.

R Stored until the printer is turned **Off**
M Memory card
T Temporary.

3. Send the file to the printer using a DOS Copy command.

10. Establishing Daily Procedures

This chapter provides some suggestions for setting up procedures for your operators.

Daily Startup Checklist

You may wish to design a check list for operators to follow each day. Here are some suggested check list items.

_____ Turn the printer **On**.

_____ Make sure ribbon and supplies are loaded.

_____ Download formats from the computer to the printer (include instructions, if necessary).

Data Entry Instructions for Operators

Find the Data Entry Guide in Appendix D, "Format Design Tools." Use this form to tell the operator what data to enter when printing supplies. Here is how to fill out the form.

1. Make copies of the form and work from the copies.

2. Write the format name and number on the first line of the form and the blank space in step 6.

3. Write the supply size on the second line. Include any other information the operator needs to know about the supply (i.e., needs ribbon, etc.).

4. Write the type of format (Temporary, Standard, Memory card, or Permanent) in the blank space on step 5.

5. Write the first prompt in the box in step 7. On the lines to the right, tell the operator how to respond.

6. Continue through all prompts in the same manner.

7. Attach a print sample to the form, if desired.

Appendix D, "Format Design Tools," includes a filled-out sample form.

Print Logs

You may wish to keep records of supplies printed. A good way to do this is to design a print log for operators to complete at the end of the day.

Here are some suggestions for types of information to include on a print log.

Date
Operator's Name
Format Name
Supply size
Quantity printed
Evaluation of print quality
Note any problems encountered

Creating DOS Batch Files for Downloading

The printer erases online formats from memory whenever you turn it **Off**. If you created your own formats, you need to download them to the printer when you want to print supplies.

Formats stored on a memory card remain on the memory card until you delete them or overwrite them with a new format identified by the same number. There is no need to download memory card formats every day.

If downloading from an MS-DOS system, you can create batch files to set communication values and download formats. It is a good idea to create a subdirectory to hold your format files for this printer.

Here is a DOS batch file that sets a serial port, changes to a subdirectory, and downloads a check digit file, format file, and batch data file.

```
MODE COM1:2400,N,8,1,P
CD\MONARCH
COPY LABEL1.CDS COM1
COPY LABEL1.FMT COM1
COPY LABEL1.BCH COM1
```

Refer to your DOS manual for more information on creating batch files.

Backing up Format and Batch Files

Keep backup copies of your format and batch files.

Contact your Monarch Sales or Customer Support Representative for further suggestions.

11. Online Information

MPCL is a standard printer control language developed for Monarch printers. It is designed to work in ASCII (MS-DOS) or EBCDIC (mainframe) environments. This chapter describes MPCL structure and syntax.

Data Stream Structure

The computer sends data to the printer in *packets*. A packet is a string of ASCII characters consisting of

- a starting token: **{**
- a sequence of characters and instructions
- an ending token: **}**

There are four types of packets: check digit packets, format packets, batch packets, and exception packets.

A data stream is made up of a series of *records*. A text field definition is an example of a record. Records are constructed with a set of parameters, which are separated by commas. A format can contain up to 14 text, non-printable text, and bar code records. Additionally, a format may contain lines, boxes, and constant text overlays. Use only uppercase characters, except in character strings enclosed in quotation marks.

The following symbols punctuate packets.

Symbol	Description
{	Left brace starts a packet.
}	Right brace ends a packet.
¦	Split vertical bar ends a record.
,	Comma separates items within records.
"ABC"	Enclose character strings in quotation marks. Empty quotes ("") identify null strings or unused fields. The printer ignores spaces, except within these character strings. Do not embed comments within a quoted string. To represent non-printing characters in the string, use a tilde (~) followed by a 3-digit ASCII code in a quoted string.
'comment'	Grave accents enclose comments. Any data enclosed in grave accents will be ignored. Do not put comments in a character string. You can also used this convention to reject mainframe data.

Example

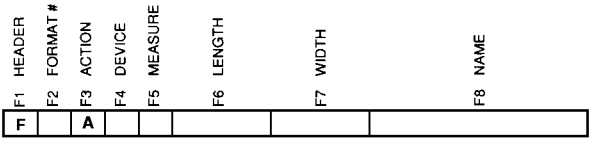
{Begin packet record 1, parameter, parameter ¦
record 2, parameter, parameter ¦
record 3, parameter, parameter ¦
record 4, parameter, parameter ¦}

NOTE: You should break packets longer than 130 characters into multiple lines, each less than 130 characters.

Format Header

A Format Header begins a format data stream. The Format Header is followed by a series of records, which determine text, non-printable text, bar code, constant text, line, or box definitions.

Message Structure



Syntax `{F1,F2,F3,F4,F5,F6,F7,"F8"`

F1. *F* — Format header. Enter **F.**

F2. *format#* — Unique number from **1-50** to identify the format.

F3**.** *action* — Options:

- **A** Add a new format to the printer.
- **C** Clear an existing format.

F4. *device* — Format storage device.

- **R** Volatile RAM
- **M** Optional memory card
- **T** The format is temporary. You must include a batch with these formats.

F5. *measure* — Unit of measure. Options:

- **E** English. Measured in 1/100 inches.
- **M** Metric. Measured in 1/10 mm.
- **G** Graphic. Measured in dots.

F6. *length* — Supply length, in units selected above. Measure supply top to bottom. The bottom is the edge that exits the printer first. Ranges:

English	**075 - 900**
Metric	**190 - 2290**
Dots	**144 - 1728**

F7. *width* — Supply width, from left to right, in units selected above. Ranges:

English	**075 - 250**
Metric	**190 - 635**
Dots	**144 - 480**

F8. *"name"* — Assign a name to the format, if desired. **1-8** characters. *Enclose it in quotation marks*. Enter **""** to let the printer assign a name.

Example `{F,1,A,R,E,300,200,"Textiles" ¦`

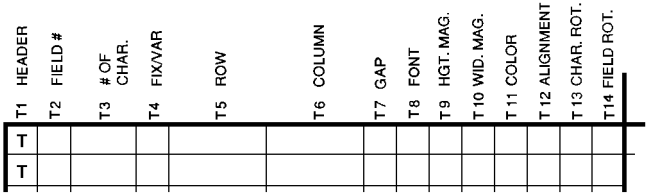
- **F**ormat Header
- format #**1**
- format being **a**dded
- stored in printer **R**AM
- measured in 1/100 inches (**E**nglish)
- **3** inch long supply
- **2** inch wide supply
- named "**Textiles.**"

Syntax Checklist

- The format header must be the first record in a format packet.
- Place the **F** immediately after the **{** or on the next line. Do not place a space or any other character before the **F**.
- Enter all information in capital letters (except phrases in quotes).
- Place a comma between all values.
- Make sure the supply size is noted in the correct units of measure.
- Make sure you have **8** items in the format record.
- Do not forget the quotation marks around item #8.
- Place a split vertical bar ¦ at the end of the record.
- All text, non-printable text, bar code, constant text, line, and box records must follow the Format Header.

Text Field

Message Structure



Syntax `T1,T2,T3,T4,T5,T6,T7,T8,T9,T10,T11,T12,T13,T14`

T1.*T* — Indicates record is a text field.

T2.*field #* — Unique number from **1-14** to identify this field.

T3.*# of char* — Maximum number of printed characters (**1-30**) in the field.

T4.*Fix/Var* — Fixed or variable length field. Options:

- **F** Fixed length
- **V** Variable length

T5.*row* — Distance from bottom of print area to lower-left corner of field. (Bottom exits the printer first.) Ranges:

English	**0 - 600**
Metric	**0 - 1525**
Dots	**0 - 1152**

T6.*column* — Distance to lower-left corner of field, from left edge of print area. Ranges:

English	**0 - 200**
Metric	**0 - 559**
Dots	**0 - 384**

T7.*gap* — Number of dots between characters. **0-99**.

T8.*font* — Style of font.

- **1** Standard
- **2** Reduced
- **3** Bold
- **4** OCRA-like

T9.*hgt. mag.* — Height magnifier, **1-7** (times).

T10.*wid. mag.* — Width magnifier, **1-7** (times).

T11.*color* — Options:

- **B** Black characters
- **W** White characters on black background

T12.*alignment* — Options:

- **L** Align on left side of field
- **C** Center text within field
- **R** Align on right side of field

T13.*char rot.* Character rotation. Options:

- **0** Top of character points to top of field
- **1** Top of character points to left of field
- **2** Top of character points to bottom of field
- **3** Top of character points to right of field

T14.*field rot.* Field rotation. Lower-left corner of field is the pivot point.

- **0** Top of field points to top of supply
- **1** Top of field points to left of supply
- **2** Top of field points to bottom of supply
- **3** Top of field points to right of supply

Example `T,1,10,V,250,50,0,1,1,1,B,C,0,0`

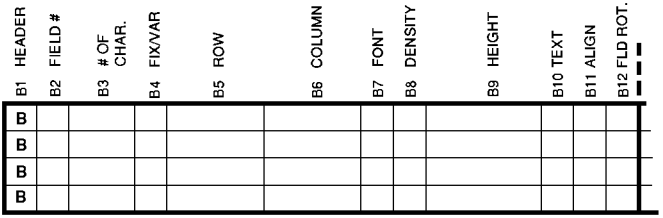
- **T**ext field
- Field #**1**
- **10** characters long
- **v**ariable length
- lower left corner of field at row = **2.5** inches
- column = **0.5** inches
- default spacing
- standard font
- height magnification **1**x
- width magnification **1**x
- **b**lack characters
- characters **c**entered in field
- no character rotation
- no field rotation.

Syntax Checklist

- For ease in syntax checking, enter all values, starting with the **T**, on a single line.
- Enter all information in capital letters (except phrases in quotes).
- Place a comma between all values.
- Make sure you have **14** items in each record.
- Make sure all fields -- text, non-printable text, and bar code -- are in order by field number (item #2) in the file.
- Place a split vertical bar ¦ after item #14.
- Go to a new line after the vertical bar.

Bar Code Field

Message Structure



Syntax `B1,B2,B3,B4,B5,B6,B7,B8,B9,B10,B11,B12`

B1.*B* Indicates record is a bar code field.

B2.*field #* Unique number from **1-14** to identify this field.

B3.*# of char* Maximum number of characters. Range **1-30**, except as specified for UPC and EAN codes.

B4.*Fix/Var* Fixed or variable length field. Options:

F Fixed length
V Variable length field.

B5.*row* Distance from bottom of print area to lower left corner of field. (The bottom exits the printer first.) Ranges:

English	**0 - 600**
Metric	**0 - 1525**
Dots	**0 - 1152**

B6.*column* Distance to lower-left corner of field from left edge of print area. Ranges:

English	**0 - 200**
Metric	**0 - 559**
Dots	**0 - 384**

B7. *font* Bar code.

1	UPC-A	**6**	EAN-8
2	UPC-E	**7**	EAN-13
3	I 2 of 5	**8**	Code 128
4	Code 39 (no check digit)		

B8.*density* Bar code density. See chart in Quick References.

B9.*height* Bar code height, in 1/100 inches, 1/10 mm, or dots. Minimum values:

English	**20**
Metric	**51**
Dots	**39**

B10.*text* Appearance of text with bar code. UPC & EAN only.

- **1** No check digit or number system.
- **5** Number system at bottom, no check digit.
- **6** Check digit at bottom, no number system.
- **7** Check digit and number system at bottom.
- **8** No text, bar code only

B11.*align.* Alignment of bar code within field. Options:

- **L** Align bar code on left margin of field.
- **C** Bar code centered in field.
- **R** Align bar code on right margin of field.

B12.*field rot.* Field rotation. Lower left corner of field is the pivot point.

- **0** Top of field points to top of supply
- **1** Top of field points to left of supply
- **2** Top of field points to bottom of supply
- **3** Top of field points to right of supply

Example `B,4,12,F,150,40,1,2,80,7,L,0`

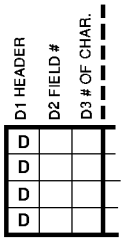
- **B**ar code
- field #**4**
- **12** characters long
- **f**ixed length
- lower-left corner located at row = **1.5** inches
- column = **0.4** inches
- use UPC-A font
- density = 80% magnification
- height **0.8** inches
- number system and check digit at bottom
- **l**eft-justified
- no field rotation.

Syntax Checklist

- For ease in syntax checking, enter all values, starting with the **B**, on a single line.
- Enter all information in capital letters.
- Place a comma between all values.
- Make sure you have **12** items in each bar code record.
- Make sure all fields -- text, non-printable text, and bar code -- are in order by field number (item #2) in the file.
- Place a split vertical bar ¦ after item #12.
- Go to a new line after the vertical bar.

Non-Printable Text Record

Message Structure



Syntax `D1,D2,D3 ¦`

D1.*D*	Field header (meaning data field).
D2.*fld#*	Unique number from **1-14** assigned to this field.
D3.*# of char*	Maximum number of characters in this field (**1-30**).

Example `D,6,12 ¦`

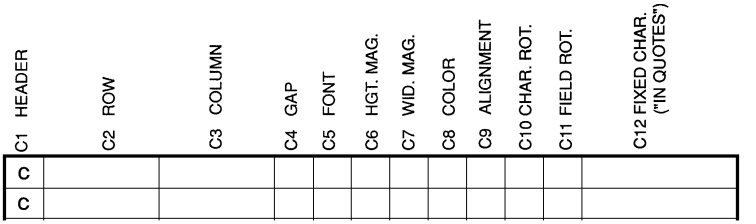
- Non-printable (**d**ata) field
- field #**6**
- **12** characters long.

Syntax Checklist

- For ease in syntax checking, enter all values, starting with the **D**, on a single line.
- Enter all information in capital letters.
- Place a comma between all values.
- Make sure you have **3** items in each record.
- Make sure all fields -- text, non-printable text, and bar code -- are in order by field number (item #2) in the file.
- Place a split vertical bar ¦ after item #3.
- Go to a new line after the vertical bar.

Constant Text Overlays

Message Structure



Syntax `C1,C2,C3,C4,C5,C6,C7,C8,C9,C10,C11,"C12"`

C1.*C* Indicates a constant text overlay record.

C2.*row* Distance from bottom of print area to lower left corner of field. (Bottom exits the printer first.) Ranges:

English	**0 - 600**
Metric	**0 - 1525**
Dots	**0 - 1152**

C3.*column* Distance to lower left corner of field, from left edge of print area. Ranges:

English	**0 - 200**
Metric	**0 - 559**
Dots	**0 - 384**

C4.*gap* Number of dots between characters. **1-99**.

C5.*font* Style of font.

1	Standard	**3**	Bold
2	Reduced	**4**	OCRA-like

C6.*hgt. mag.* Height magnifier, **1-7** (times).

C7.*wid. mag.* Width magnifier, **1-7** (times).

C8.*color* Options:

- **B** Black characters
- **W** White characters on black background

C9.*alignment* Enter **L**. Only left alignment is supported.

C10.*char rot.* Character rotation. Options:

- **0** Top of character points to top of field
- **1** Top of character points to left of field
- **2** Top of character points to bottom of field
- **3** Top of character points to right of field

C11.*field rot.* Field rotation. Lower left corner of overlay is the pivot point.

- **0** Top of overlay points to top of supply
- **1** Top of overlay points to left of supply
- **2** Top of overlay points to bottom of supply
- **3** Top of overlay points to right of supply

C12.*fixed char.* Fixed characters to appear in the field. Maximum **100** characters. Surround with quotation marks.

Example

```
C,350,40,0,1,1,1,B,L,0,0,"Dry Clean
Only"
```

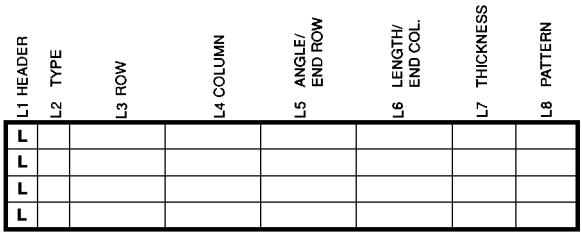
- **C**onstant text overlay
- Lower left corner of field at row = **3.5** inches
- Column = **0.4** inches
- Default spacing
- Standard font
- Height magnification **1**x
- Width magnification **1**x
- **B**lack characters
- Characters aligned **l**eft
- No character rotation
- No field rotation
- **"Dry Clean Only"** prints on all tags.

Syntax Checklist

- For ease in syntax checking, enter all values, starting with the **C**, on a single line.
- Enter all information in capital letters (except phrase in quotes).
- Place a comma between all values.
- Do not forget the quotation marks around item #12.
- Place a split vertical bar ¦ after item #12.
- Go to a new line after the vertical bar.
- Make sure you have **12** items in the constant text overlay record.

Line Records

Message Structure



Syntax `L1,L2,L3,L4,L5,L6,L7,L8`

L1.*L* — Indicates a line record.

L2.*type* — Type of line. Only vertical and horizontal lines are supported. Options:

- **S** Segment. You choose the starting point and ending point.
- **V** Vector. You choose the starting point, the angle, and length.

L3.*row* — Distance from bottom of print area to line origin. Measure in 1/100 in., 1/10 mm, or dots. Ranges:

English	**0 - 600**
Metric	**0 - 1525**
Dots	**0 - 1152**

L4.*column* — Distance from left edge of the print area to line origin. Measure in 1/100 in., 1/10 mm, or dots. Ranges:

English	**0 - 200**
Metric	**0 - 559**
Dots	**0 - 384**

L5.*end row* — If using *Segments*

Row location of end point. Measure from bottom of print area. Ranges same as above. On horizontal lines, this value must match item **L3**.

angle — If using *Vectors*

Angle of line. **0**, **90**, **180**, or **270**.

L6.*end col.* — If using *Segments*

Column location of end point. Measure from left edge of print area. Ranges same as above. On vertical lines, this value must match item **L4**.

length — If using *Vectors*

Length of the line in selected units. Ranges same as above.

L7.*thickness*	Line thickness **0-99**. Measure in dots.
L8.*pattern*	Line pattern. Only 1 pattern supported. Enter **""** in this parameter.

Example `L,S,110,30,110,150,10,""` ¦

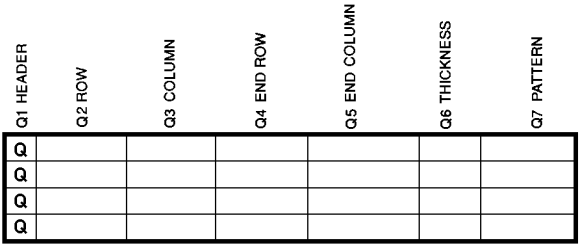
- **L**ine
- Line defined as a **s**egment
- Origin row = **1.1** inches
- Origin column = **0.3** inches
- End point at row = **1.1** inches (horizontal line)
- End point at column = **1.5** inches
- **10** dots thick
- Solid line.

Syntax Checklist

- For ease in syntax checking, enter all values, starting with the **L**, on a single line.
- Place a comma between all values.
- Make sure you have **8** items in each line record.
- Check the coordinates in items 3, 4, 5, and 6. Item #3 must equal item #5 **OR** item #4 must equal item #6.
- Compare coordinates to supply dimensions. Make sure the line does not run off the supply.
- Do not put a space or any other character in the quotation marks in item #8.
- Place a split vertical bar ¦ after item #8.
- Go to a new line after the vertical bar.

Box Records

Message Structure



Syntax `Q1,Q2,Q3,Q4,Q5,Q6,Q7`

Q1.*Q*	Indicates a box (Quadrilateral) record.
Q2.*row*	Distance from *bottom* of print area to *lower-left* corner of box. Measure in 1/100 in., 1/10 mm, or dots. Ranges: English **0 - 600** Metric **0 - 1525** Dots **0 - 1152**
Q3.*column*	Distance from *left edge* of print area to *lower-left* corner of box. Measure in 1/100 in., 1/10 mm, or dots. Ranges: English **0 - 200** Metric **0 - 559** Dots **0 - 384**
Q4.*end row*	Distance from *bottom* of print area to *upper-right* corner of box. Ranges same as *row* above.
Q5.*end col.*	Distance from *left edge* of print area to *upper-right* corner of box. Ranges same as *column* above.
Q6.*thickness*	Line thickness **0-99**. Measure in dots. Thickness fills to center of box.
Q7.*pattern*	Line pattern. Only 1 pattern supported. Enter **""** .

Example `Q,240,30,270,150,3,"" ¦`

- Box (**Q**uadrilateral)
- Lower-left corner row **2.4** inches
- Lower-left corner column **0.3** inches
- Upper-right corner row **2.7** inches
- Upper-right corner column **1.5** inches
- **3** dots thick
- Solid line.

Syntax Checklist

- For ease in syntax checking, enter all values, starting with the **Q**, on a single line.
- Enter all information in capital letters.
- Place a comma between all values.
- Make sure you have **7** items in each box record.
- Compare coordinates to supply dimensions. Make sure the box does not run off the supply.
- Do not put a space or any other character in the quotation marks in item #7.
- Place a split vertical bar ¦ after item #7.
- Go to a new line after the vertical bar.

Field Options

Syntax `R,option#,argument(s).....`

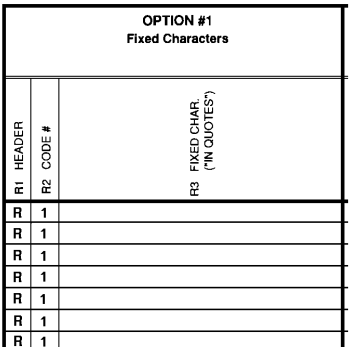
R	Field option header.
option#	Option number: **1** Define fixed characters. **2** General data type restrictions. **3** Detailed data type restrictions. **4** Copy data from previous field. **5** Define input source. **20** Define data entry prompt. **30** Pad data to left or right with specified character. **31** Define check digit mode and select algorithm. **42** Format as a price field. **60** Define incrementing or decrementing field.
argument(s)	Varies per option. See following definitions.

You can apply field options to text, non-printable text, or bar code fields. You can use multiple options with most fields, and in any combination except as noted with each definition.

Options must immediately follow the text, non-printable text (data), or bar code fields to which they apply.

Definitions

Option #1 Define characters that are always printed.



OPTION #1
Fixed Characters

R1 HEADER	R2 CODE #	R3 FIXED CHAR. (*IN QUOTES*)
R	1	
R	1	
R	1	
R	1	
R	1	
R	1	
R	1	

Syntax `R,1,"fixed characters"` ¦

a. Defining fixed characters for entire field

- Recommend using constant text overlays instead.
- Use with Option **5** to eliminate prompt.
- Character string must be enclosed in quotation marks.

Example `R,1,"Made in USA"` ¦

This example defines the fixed phrase "Made in USA" to print in all batches.

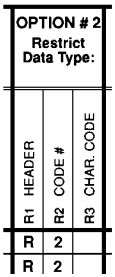
b. Defining fixed characters for part of field

- Place underscores (_) in non-fixed positions.
- Non-fixed positions can be filled by user or copied data (Option **4**).
- Character string must be enclosed in quotation marks.

Example
```
R,1,"Inspected by _ _ _ _" ¦
R,20,"Inspector #:" ¦
```

This example fixes the characters "Inspected by" and prompts the user to enter his or her inspector number.

Option #2 Restrict data type for entire field. Do not use with Option **3**.



NOTE: If you do not specify this options, all letters, numbers, and printable symbols are permitted. See Appendix C, "Printable Characters," for a complete list of printable characters.

Syntax `R,2,code ¦`

code Numeric code from the following list.

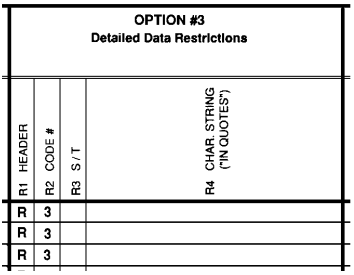
- **1** Numeric only [0..9]
- **2** Alpha only [A..Z,a..z]
- **3** Symbols only [printable characters except letters and digits]
- **4** Alpha and numeric
- **5** Numeric and symbols
- **6** Alpha and symbols

Example `R,2,1 ¦`

This example limits data in the field to digits only.

Option #3 Detailed data type restrictions or template of character types. Do not use with Option **2**.

NOTE: See Appendix C, "Printable Characters," for a complete list of printable characters.



OPTION #3 Detailed Data Restrictions			
R1 HEADER	R2 CODE #	R3 S/T	R4 CHAR. STRING ("IN QUOTES")
R	3		
R	3		
R	3		

Syntax `R,3,[S/T],"string"` ↵

a. Detailed data type restrictions

- Use "S" option in parameter #3. Defines a specific set of characters for the entire field. You can limit input to some, but not all letters or digits.
- The string length does not have to match the field length. Maximum string length is 30 letters, and must be enclosed in quotation marks.

Example `R,3,S,"ABC1234567890"` ↵

This example limits input in this field to the letters A, B, and C, and all digits.

b. Template of allowable data types

- Use "T" option in parameter #3. Create a template of allowable data types by placing character indicators in each character position.
- The number of characters in the string must match the length of the field, enclosed in quotation marks.
- Indicators of allowable data types are

*****	Any printable character.
#	Any digit [0..9].
@	Any letter [A..Z,a..z].
_	Reserved position for a fixed or copied character.

Example `R,3,T,"***#_ _ _ _"`

This example allows any printable character in positions 1, 2, and 3, digits in position 4, and reserves positions 5 through 8 for fixed or copied data.

Option #4 Copy data from a previously-defined field. You can use it with any option (multiple times, if needed).

When copying from more than 1 field, copy into destination field left to right.

Syntax `R,4,src fld,src start,# to copy,dest start,copy code ¦`

src fld The field number where the data originates.

src start The position number of the first character in *src fld.*

 # to copy Number of characters to copy.

dest start Starting character position in destination field.

copy code Type of copy.

- **1** Copy the field as is (including price symbols, pad characters, check digits, etc.).
- **2** Copy unformatted data (without price characters, pad characters, etc.).

OPTION #4
Copy Data from Previous Field

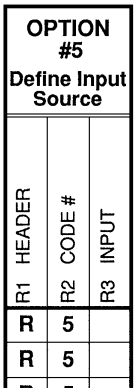
R1 HEADER	R2 CODE #	R3 SRC FIELD	R4 SRC START	R5 # TO COPY	R6 DEST. START	R7 COPY CODE
R	4					
R	4					
R	4					
R	4					

Example `R,4,2,1,4,3,2 ¦`

This example copies data from field 2, starting with the first character, copies 4 characters into the field beginning at position 3 in the destination field, and drops any price or pad characters that may have been added to the field.

Option #5 Define how data will be entered. When using with other options, place this option *after* all other options for the field.

Syntax `R,5,code ¦`



code Input code from the following list.

D Default (computer, if on-line; keyboard,if off-line)

K Keypad or computer keyboard connected to printer.

H Host

N No user input. Data is inserted by Option **4** (copy) or Option **1** (fixed characters). Eliminates user prompt. Do not use this code when using Option **20**.

S Scanner

Example `R,5,N ¦`

This example eliminates the user prompt for this field. Data is copied into the field using Option **4**.

Option #20 Defines the operator prompt. Can be used with any option.

OPTION #20 Operator Prompt		
R1 HEADER	R2 CODE #	R3 CHARACTER STRING
R	20	
R	20	
R	20	
R	20	
R	20	
R	20	

Syntax `R,20,"prompt in quotes"` ¦

- Do not use on fields filled entirely by fixed characters or copied data.
- The prompt should be 15 characters or less, enclosed in quotation marks.
- Do not use this option with the Option **5** "N" listing.

Example `R,20,"Enter Part #:"` ¦

The printer will display "Enter Part #:" for the operator to enter data in this field.

Option #30 Pad data to left or right with specified character. Can be used with any option except Option **42**.

OPTION #30 Pad Data			
R1 HEADER	R2 CODE #	R3 L/R	R1 CHARACTER
R	30		
R	30		

Syntax `R,30,L/R,"character"` ¦

L/R **L** = Pad field on left side

R = Pad field on right side.

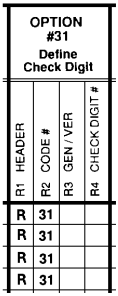
"character" Pad character (must be printable). Character must be enclosed in quotation marks.

NOTE: Do not use on fixed length fields.

Example `R,30,L,"X"` ¦

If a variable length field is not completely filled with batch data, this option fills in the remaining positions in the field with the character X.

Option #31 Define check digit mode and select calculation scheme. Do not use with Options **42** or **60**.



Syntax `R,31,gen/ver,check digit ¦`

gen/ver **G** = generate check digit
V = verify check digit entered by user

check digit # Check digit scheme number, as defined in Chapter 4, "Using Check Digits."

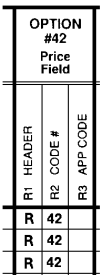
NOTES: Do not use on UPC, EAN, or other fields with predefined check digits.

Use on numeric fields only.

Example `R,31,G,5 ¦`

This example generates a check digit using algorithm #5.

Option #42 Format as a price field. Do not use with Options **31** or **60**.



Syntax `R, 42, code ¦`

code Appearance code.

1 Prints price field in standard notation as defined by country setting.

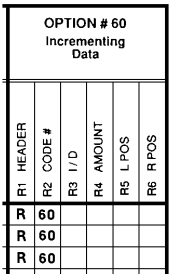
NOTES: Use on numeric fields only.

Use printer "Setup - Defaults" menu to select monetary notation and symbols by country setting (See your *Operator's Handbook*).

Example `R,42,1 ¦`

This example turns a text field into a price field.

Option #60 Define the incrementing or decrementing portion of data. Do not use it with Options **31** or **42**.



OPTION # 60 Incrementing Data					
R1 HEADER	R2 CODE #	R3 I/D	R4 AMOUNT	R5 L POS	R6 R POS
R	60				
R	60				
R	60				

Syntax `R,60,I/D,amount,l pos,r pos ¦`

I/D **I** = incrementing field

D = decrementing field.

amount The value increases or decreases.

l pos Left-most position in inc/dec portion of field.

r pos Right-most position in inc/dec portion of field.

NOTES: Use on numeric data only.

When entering batch data for the field, enter the first number in the sequence. The first number must have the same number of digits as the highest number. For example, to count from 1 to 999, the first number must be entered as 001.

Example `R,60,I,5,1,6 ¦`

This example causes numeric data in the field to increase by 5 with each ticket printed. Incrementing data is in positions 1 through 6.

Example
```
T,5,20,V,80,10,1,1,1,1,B,L,0,0 ¦
R,4,3,1,2,1,2 ¦
R,4,2,1,18,3,1 ¦
```

- Text field #5 has 20 characters.
- The first option does the following.
  - copies data into field 5 from field 3
  - copies 2 characters, starting at position 1, from field 3
  - places the characters, beginning at position 1, in field 5
  - removes formatted characters from copied data.
- The second option does the following.
  - copies data into field 5 from field 2
  - copies 18 characters, starting at position 1 from field 2
  - places the characters, beginning at position 3, in field 5
  - retains formatted characters in copied data

Syntax Checklist

- Insert a line directly after the text or bar code field to which the option applies. **Place each option on a new line following the field to which it applies.**
- Enter values for each field option on separate lines following the text or bar code field. For example, begin with the first **R** on the first line after the field. The next applicable **R** would go on a new line.

  NOTE: Place Option **5** last, if used.
- Enter all information in capital letters (except phrases in quotes and comments).
- Make sure all values are separated by commas.
- Make sure the number of items on each line matches the number of items shown on the Format Worksheet for each option.
- Place a split vertical bar ¦ at the end of each line.

Format Syntax Checklist

When you finish the format, check the overall syntax in the format packet.

- The format must begin with **{** and end with **}**.
- Make sure you have no more than 14 *fields* in the format packet.
- Make sure all fields are in order by the desired user prompt.
- Make sure all *field numbers* are in ascending sequence.
- Make sure all items are separated by commas.
- Make sure each record ends with a split vertical bar ¦

Batch Packets

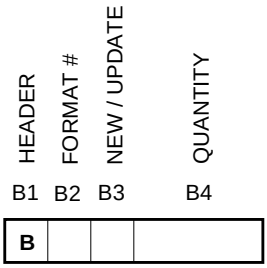
Batches are sent as a series of batch packets. A batch packet may contain two types of records.

1) a batch header
2) one or more batch data records.

Batch Header Section

A batch header begins the batch data stream. It tells which format the batch uses and how many supplies to print.

Message Structure



Syntax {B1,B2,B3,B4 ¦

B1.*B*	Batch message header.
B2.*format#*	Format number (**1-99**) to use.
B3.*N/U*	Controls how image is generated.
	N New. Fill all fields with new data. Any missing fields will be blank.
	U Update last image with 1 or more batch data fields. All other fields remain same as last queued batch.
B4.*quantity*	Quantity to print (**1-9999**)

Example {B,3,N,100¦

- Begin **B**atch packet
- Use format #**3**
- Sending **n**ew batch data for all fields
- Print **100** supplies.

Syntax Checklist

- The packet must begin with **{**.
- Do not place a space or any other character between the **{** and **B**.
- Make sure there are 4 items in the batch header record.
- Make sure all items are separated by commas.
- Make sure the batch header ends with a split vertical bar ¦ .

Batch Data Record

Batch data records follow the batch header. Batch data records should be sent in order by field number.

Message Structure

Field #	Data
1	
2	

Syntax `field#,"data string" ¦`

1. *field#* Tells the printer which text, bar code, or non-printable text field in which to insert the following data.
2. *"data string"* Provides the actual information to print in the selected field. Always enclose in double quotes.

Example

```
1,"Size 12" ¦
2,"" ¦
3,"Blue" ¦ }
```

- Print the phrase "Size 12" in field 1.
- Print field 2 with fixed characters as applied by option 1.
- Print the word "Blue" in field 3.

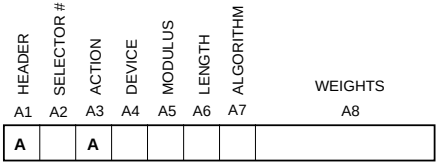
Syntax Checklist

- Make sure there are 2 items in each batch data record.
- Each field must end with a split vertical bar ¦ .
- Enter a batch data record for each field, including fields with all fixed characters and all copied data.
- To enter data for fixed or copied data, send a null string (a set of quotation marks with no data, like this: **""**).
- The number must contain the same number of digits as the highest number in the sequence. For example, to count the numbers 1 to 9999, the first number entered must be "0001" .
- The last batch data record must be followed by a split vertical bar ¦ and right brace **}**.

Check Digits

Check digit algorithms are pre-defined for UPC and EAN bar codes. If you wish to apply a check digit algorithm to a numeric text field or a bar code that has no pre-defined algorithm, use the syntax below to define a check digit packet.

Message Structure



Syntax {A1,A2,A3,A4,A5,A6,A7,"A8"

{	Starting token.
A1.*A*	Indicates a check digit data stream.
A2.*selector*	Assign a number from 1-9 to this check digit formula.
A3.*action*	Options: **A** = add check digit **C** = clear check digit
A4.*device*	Printer storage device. Options: **R** = Printer RAM **M** = Memory card
A5.*modulus*	Number from **2-10**. Modulus used in calculation.
A6.*fld-length*	Number of weighting digits used. Should equal the number of digits in the field, minus the check digit. This number must equal the length of *weights*. Maximum **29**.
A7.*[D/P]*	Algorithm. **D**=sum of digits. **P**=sum of products.
A8.*"weights"*	String of digits used for calculation. Note that the string must be in double quotes. The number of digits in this string should equal the number in parameter #5 (*fld-length*).
}	Ending token.

Example `{A,1,A,M,10,5,P,"65432"¦}`

- Check digit **a**lgorithm header
- Assign number **1** to the algorithm
- Being **a**dded
- Store on a **m**emory card
- Use a modulus of **10**
- Field length **5** characters
- Use sum of **p**roducts algorithm
- Use **"65432"** as weights.

Syntax Checklist

- Make sure the packet begins with **{** and ends with **}**.
- The field must end with a split vertical bar ¦.
- Make sure there are **8** items in the record.
- Do not forget the quotation marks around the character string in item #8.

Transmitting Data

Send packets in this order.

1. Check digit packets
2. Format packets
3. Batch packets

Check digit packets are stored until the printer is turned **Off**. The data stream would appear in an order similar to this.

{ Check digit packet ¦}
{ Format header ¦ field1 ¦ option ¦ option ¦ field2 ¦ option ¦ field3 ¦}
{ Batch header ¦ batch data ¦ batch data ¦ batch data ¦}

On an MS-DOS system, a standard DOS command is used to transmit the data stream to the printer. For example, the following commands could be used to transmit an ASCII file called FRMT1.FMT to a 9401 or 9402 printer connected to COM port 1.

```
MODE COM1:2400,N,8,1,P
COPY FRMT1.FMT COM1
```

If the printer is connected to COM2, simply change "COM1" to "COM2" in the above statements.

Sample Format Data Stream

Here is a sample format data stream.

`{F,6,A,R,M,350,508,"TEST2" ¦`	**Begins definition for Format #6.**
`C,250,80,0,1,2,1,W,C,0,0 ¦`	**Prints "MONARCH MARKING"**
`"MONARCH MARKING" ¦`	**on all labels.**
`B,1,12,F,110,115,1,1,120,5,L,0 ¦`	**Definition for field #1, bar code.**
`T,2,18,V,30,30,1,1,1,1,B, L,0,0 ¦`	**Definition for field #2, text field.**

This data stream results in the following format.

Use the following batch information with the format shown above.

{B,6,N,10¦	**Header, uses format 6, prints 10 labels.**
1,"12345678901"¦ ,"	**Enters 12345678901 in field #1.**
2,"DAYTON, OHIO "¦	**Enters DAYTON, OHIO in field #2.**

The following label results from sending this batch with the format shown above.

See Appendix B, "Data Stream Examples," for more data stream examples.

Interactive Mode

Interactive mode enables two-way communication between a 9401 printer and a host. With interactive mode, a host can

- send a message to the printer operator.
- request and receive information from the printer operator.
- use the printer as a data collection device.

NOTE: You cannot use protocol converter models 2071, 2072, 2073, and 2074 in interactive mode.

Processing Overview

The following procedure summarizes one transaction between the host and printer in interactive mode

1. The operator sets the printer in Print mode.
2. The host sends the printer a data stream in the form of an exception packet (see "Exception Packets"). If it uses XON\XOFF flow control, the host must precede the datastream with an initial XON.
3. When the printer receives the packet, it returns a status message (see "Printer Status Codes"). It also enters interactive mode and is ready to transmit data to the host after the host sends a prompt.
4. If the host requests a response from the printer, the operator enters the response at the printer (up to 30 characters) and presses one of the following keys:
   - Enter (to send entered data)
   - Esc (to respond with no data).

   NOTE: The printer appends a carriage return to the end of the reponse (even if the operator enters no data).

The host should wait for any reponse before sending further data. If the host sends data to the printer before the printer responds to a request, the printer will cancel the reponse by sending a carriage return with no data to the host. It then processes the new data.

Exception Packets

This section describes exception packets, including their syntax.

Syntax `{E,"#,[message]" ¦ }`

E	is a constant, indicating that the data stream is an exception packet.
#	A code indicating what the printer should do. Values are as follows: 0 Print message on line 1 of the display. 1 Provide input. 2 Print message on line 1 of the display and provide input. 3 Sound a tone. 4 Print message on line 1 of the display and sound a tone. 5 Sound a tone and provide input. 6 Print message on line 1 of the display, sound a tone, and provide input.
message	A message used to perform the action specified in #. It cannot be more than 15 characters long. Use message only with actions 0, 2, 4, and 6. If you specify message with actions 1, 3, or 5, the printer will ignore it.

Example `{E,"2,Scan bar code" ¦ }`

This example displays Scan bar code on line 1 of the printer display and enables the printer operator to provide input to the host.

Printer Status Codes

The printer sends one of the following return codes to the host after receiving a packet

Code	Description
CAN	The printer detected an error such as an open print head, and cannot process the request.
EOT	The printer received a 9401 MPCL packet from the host.
ESC	The printer operator pressed Esc .
ETX	The printer operator pressed Enter without entering any data.

Using a Scanner in Interactive Mode

You must set the Auto Enter option depending on how you enter data, as follows

Set Auto Enter to...	To send scanned data...
Automatically	Yes
Only after you press Enter	No

See the *Operator's Handbook* for information on how to set Auto Enter.

Example Printer/Host Dialog

Following is an example of what might happen during a dialog between the printer and the host in the case of an employee marking goods in a store.

HOST:	Sends an exception packet ({E, "6, Scan Shelf ID" ¦}).
PRINTER:	The operator scans the shelf label. The printer sends the information back to the host.
HOST:	Searches a database for the item number and retrieves the label format for the item. Then, it sends an exception packet ({E, "6, Enter Quantity" ¦}).

PRINTER:	The operator enters the quantity of items and presses Enter .
HOST:	Enters the quantity into an inventory database and batch data stream. Then, it sends the format and batch data stream to the printer.
PRINTER:	Prints labels for the number of items counted.

12. Quick References

This chapter repeats the character and line charts from Chapter 2, "Designing a Format," as a convenient reference.

Text Fonts

The table on the following page shows the character sets available for each text font supported by this printer.

NOTES: Use ~155 in the data stream For example, to download data to print 59¢ in field 1, place the following sequence in the batch data stream:

1,"59~155"

Use a dollar sign (**$**) in the data stream to print monetary symbols. The monetary symbol printed is determined by the country setting on the printer.

Special characters are available for Standard and Reduced fonts, in addition to the characters shown on the next page. See Appendix C, "Printable Characters."

Standard Font

Reduced Font

Bold Font

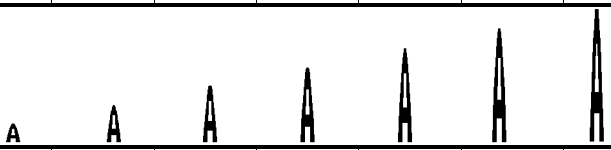
OCRA-like Font

Character Height

This chart shows character heights in magnifications 1-7 for each text font in 1/100 inches, 1/10 millimeters, and Dots.

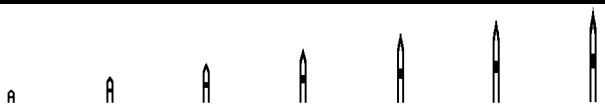
Font Magnification

Standard



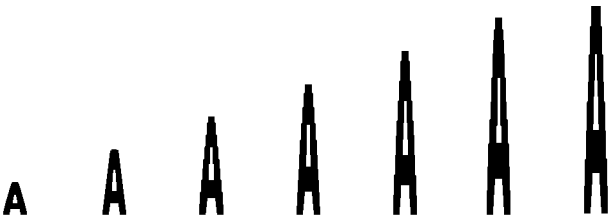
	1x	2x	3x	4x	5x	6x	7x
1/100 in.	11.4	22.9	34.3	45.8	57.2	68.7	80.1
1/10 mm	29.1	58.1	87.2	116.2	145.3	174.3	203
Dots	22	44	66	88	110	132	154

Reduced



1/100 in.	7.3	14.6	21.8	29.1	36.4	43.7	51
1/10 mm	18.5	37.0	55.5	74.0	92.5	110.9	129
Dots	14	28	42	56	70	84	98

Bold



1/100 in.	17.7	35.4	53.1	70.8	88.5	106.2	124
1/10 mm	44.9	89.8	134.7	179.6	224.5	269.4	314
Dots	34	68	102	136	170	204	238

OCRA-Like (1x only)

1/100 in.	12.5
1/10 mm	31.7
Dots	24

Character Width

This chart shows character widths in magnifications 1-7 for each text font in 1/100 inches, 1/10 millimeters, and Dots. The values in this chart include default character spacing.

Width Mag.	Units	Standard Character Width	Standard Sample	Reduced Character Width	Reduced Sample	Bold Character Width	Bold Sample
1x	1/100 in.	8.85		4.17		14.06	
	1/10 mm	22.49		10.58		33.72	
	Dots	17	A	8	A	27	A
2x	1/100 in.	16.15		7.81		26.56	
	1/10 mm	41.01		19.84		67.47	
	Dots	31	A	15	A	51	A
3x	1/100 in.	23.44		11.46		39.06	
	1/10 mm	59.53		29.10		99.22	
	Dots	45	A	22	A	75	A
4x	1/100 in.	30.73		15.10		55.56	
	1/10 mm	78.05		38.36		130.97	
	Dots	59	A	29	A	99	A
5x	1/100 in.	38.02		18.75		64.06	
	1/10 mm	96.57		47.63		162.72	
	Dots	73	A	36	A	123	A
6x	1/100 in.	45.31		22.40		76.56	
	1/10 mm	115.09		56.89		194.47	
	Dots	87	A	43	A	147	A
7x	1/100 in.	52.60		26.04		89.06	
	1/10 mm	133.61		66.15		226.22	
	Dots	101	A	50	A	171	A

NOTE: OCRA-like 1x character width is

English	8.32
Metric	29.10
Dots	22

Bar Codes

These bar codes are available on the 9401 and 9402 printers.

Model 9401/9402 Barcodes					
				Nominal Width(X)	
Barcode	**MCPL Density**	**Char/Inch**	**Ratio**	**Inches**	**Dots**
UPC/EAN	**2**	**80%**	**N/A**	**.0104**	**2**
	4	120%	N/A	.0157	3
I 2 of 5	13	13.74	2:1	.0104	2
	12	**12.02**	**1:2.5**	**.0104**	**2**
	11	10.68	1:3	.0104	2
	10	10.68	1:3	.0104	2
	9	9.16	1:2	.0157	3
	8	8.36	1:2.33	.0157	3
	7	6.87	1:2	.0209	4
	6	6.01	1:2.5	.0209	4
	5	5.34	1:3	.0209	4
	4	4.01	1:2.5	.0314	6
	3	3.05	1:3	.0366	7
	2	2.00	1:2.5	.0628	12
	1	1.02	1:3	.1099	21
Code 39	**+7**	**6.63**	**1:2.5**	**.0104**	**2**
	6	6.01	1:3	.0104	2
	5	N/A			
	4	4.01	1:3	.0156	3
	3	3.32	1:2.5	.0209	4
Codabar	**+8**	**8.74**	**1:2.5**	**.0104**	**2**
	7	8.01	1:3	.0104	2
	6	N/A			
	5	4.81	1:2	.0209	4
	4	4.37	1:2.5	.0209	4
	3	2.91	1:2.5	.0314	6
	2	2.00	1:3	.0419	8
Code 128	**8**	**8.74/17.48**		**.0104**	**2**
	6	5.83/11.66		.0156	3
	4	4.37/8.74		.0208	4

The densities are for the data only and don't include start/stop characters and check digits. The default values are in bold. Second density on Code 128 is for all numeric data.

Line Thickness

Line thickness is measured in dots. 1 dot = 1/192 inch. Maximum line thickness is 99 dots.

Thickness	Example
1	
5	
10	
20	
30	
40	
50	
60	
75	
90	

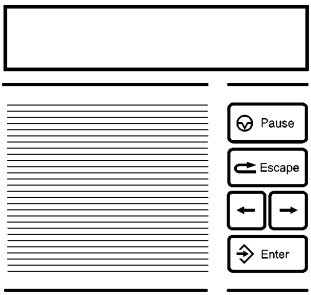
13. Diagnostics

This chapter contains simple tracking and diagnostic procedures. This information will be helpful if you need to contact Technical Support.

Setting Passwords

One of the first things the administrator should do is establish a password for administrative and diagnostic functions. You need a password for access to diagnostic functions.

5-Key Keypad



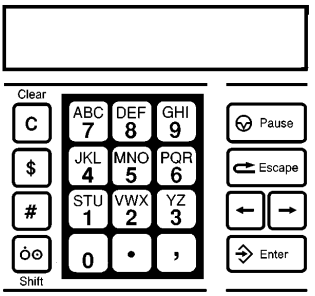
The password is preset for printers with the basic keypad. You cannot change it without a computer keyboard connected to it. See instructions for the computer keyboard in this chapter.

The factory-set password is

This password can also be used on the 21-key keypad.

NOTE: If you change the password using the computer keyboard, you will need the keyboard or 21-key keypad to access any function requiring the new password.

21-Key Keypad

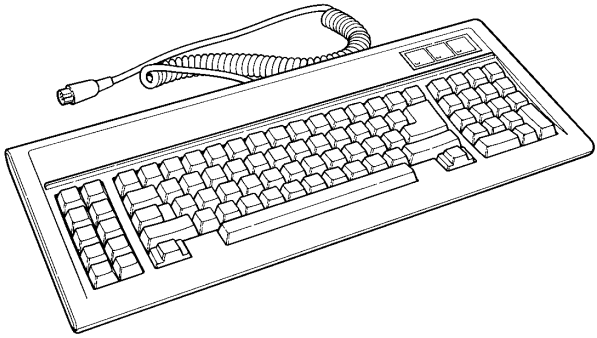


Press and hold Esc to go to the Main menu.

When you see	Do this
MAIN MENU	Press ← or → until you see Setup. Press Enter.
SETUP Supply	Press → until you see Passwords. Press Enter.
PASSWORDS Display	Press → until you see Change. Press Enter.
Enter password: -------	Type the old password (the default is MGR).
New passwd: -------	Type the new password. Press Enter.
Retype passwd: -------	Type the new password again. Press Enter.

The menu should flash "Password Changed," then return to the Password menu. If it does not, you did not successfully change the password (probably due to not entering the password the same way twice). Return to the Main menu to save the new password.

Monarch Computer Keyboard



Turn off the NumLock on the keyboard and use the left and right cursor arrows.

Press and hold [Esc] to go to the Main Menu.

When you see	Do this
MAIN MENU	Press [←] or [→] until you see Setup. Press [Enter].
SETUP Supply	Press [→] until you see Passwords. Press [Enter].
PASSWORDS Display	Press [→] until you see Change. Press [Enter].
Enter password: -------	Type the old password (the default is MGR).
New passwd: -------	Type the new password. Press [Enter].
Retype passwd: -------	Type the new password again. Press [Enter]. Return to the Main menu to save the password.

Checking the Software Version

Press and hold Esc to go to the Main Menu.

When you see	Do this
MAIN MENU	Press → until you see Diagnostics. Press Enter.
Enter password: -------	Type your password. Press Enter.
DIAGNOSTICS Version	Press Enter.
You will see	
M9401/02 #098292 SN00000000	Line one lists the printer model number (M9401/02) and the part number for the printer ROM. Line two lists the serial number of the printer. Press Enter again.
You will see	
VERSION 3.X	Line one is the version of software in the printer. Line two of this display says "Extended Memory" on printers with extra memory installed.

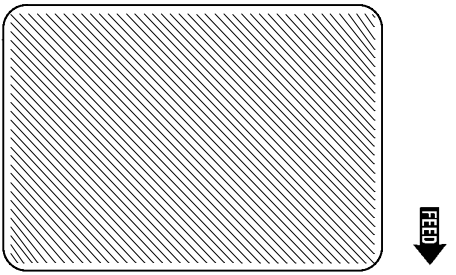
Printing a Test Label

Press and hold Esc to go to the Main Menu.

When you see	Do this
MAIN MENU	Press → until you see Diagnostics. Press Enter.
Enter password: -------	Type your password. Press Enter.
DIAGNOSTICS Version	Press → until you see User Diag. Press Enter.
USER DIAG Supply Quality	Press → until you see Test Label. Press Enter.
TEST LABEL Test Pattern	You have three selections: *Test Pattern* checks print head quality *Test Label 1* checks print quality *Test Label 2* gives critical service data Select Test Pattern or Test Label 1. Press Enter.
Quantity? 1-	Type the quantity of test labels you want to print. Press Enter.

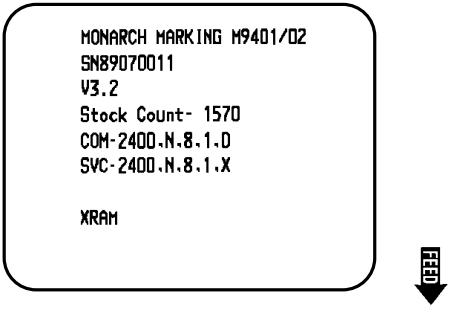
The test label should look like this.

Test Pattern



Test Label 1

Test Label 2



Checking Supply Quality

The printer continuously stores data from the last 16 supplies printed. This data reflects the quality of the sensor marks on the supply.

1. Print a batch of supplies or test labels.
2. Press and hold Esc to go to the Main Menu.

When you see	Do this
MAIN MENU	Press → until you see Diagnostics. Press Enter.
Enter password: -------	Type your password. Press Enter.
DIAGNOSTICS Version	Press → until you see User Diag. Press Enter.
USER DIAG Supply Quality	Press Enter.

If you have not printed any labels, you will see a message saying "No data."

If you have printed labels since turning the printer on, you will see

Len	Min	Max	OK
0290	036	188	Y

- The first listing, Len, is the length of the supply in dots.
- The Min and Max listings measure reflectivity of the sensor mark on the supply. The Min listing typically reads below 50, and the Max listing typically reads between 150 and 255. Under normal conditions, these listings should not fluctuate more than 20 units between readings.
- The OK listing tells whether the sensor mark on the supply passed a detection test.

Press → to see other readings. The printer stores readings on the last 16 tags or labels printed.

Checking Printer Memory Usage

You can run a test to see how much memory is used by formats and other data on each device. This test is for online users who need to know whether they can download new data to the printer.

Press and hold Esc to go to the Main menu.

When you see	Do this
MAIN MENU	Press → until you see Diagnostics. Press Enter.
Enter password: -------	Type your password. Press Enter.
DIAGNOSTICS Version	Press → until you see User Diag. Press Enter.
USER DIAG Supply Quality	Press → until you see Device Usage. Press Enter.
FORMAT TYPE Temporary	Select the device you want to check.

Device	Selection
Volatile RAM	Temporary
Memory Card	Memory Card
Custom ROM	Permanent
Fixed ROM	Standard

Press Enter to select the device.

If the device contains no formats, you will see

Device Empty. Press Enter.

Press Enter to continue.

If the device contains formats, you will see

Memory Usage: 001505/001505

The number on the left is the amount of memory used by formats in that device.

The number on the right is the total amount of memory in the device.

To find the amount of memory remaining, subtract the number on the left from the number on the right.

Press Enter again to view the format names and the amount of memory used by each format.

Testing Your Scanner

This test verifies that your scanner is reading correctly. Make sure you have selected a scanner from the Port Settings - Scanner Comm menu before running this test.

Press and hold Esc to go to the Main menu.

When you see	Do this
MAIN MENU	Press → until you see Diagnostics. Press Enter.
Enter password: _ _ _ _ _ _ _ _	Type your password. Press Enter.
DIAGNOSTICS Version	Press → until you see User Diag. Press Enter.
USER DIAG Supply Quality	Press → until you see Scanner Test. Press Enter.
	The printer pauses momentarily to initialize the scanner.
SCAN: _ _ _ _ _ _ _ _	Scan your data.

If the scanner reads correctly, the data appears on the printer display. Press ← or → to view data more than 16 characters long.

If you see

No scanner.

one of the following conditions exists

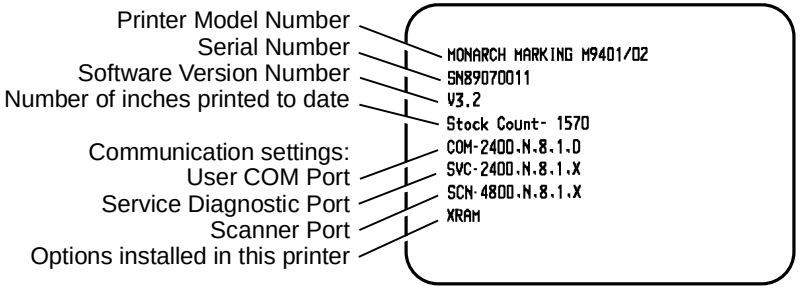
- No scanner from the the Port Settings - Scanner Comm menu
- The scanner is not connected properly.

You can run this test as many times as necessary to check the scanner or data. Press Esc to exit the scanner test.

Calling for Service

Before you call service, follow the steps under "Printing a Test Label" to print Test Label 2.

The test label displays the following information, which may be helpful to service representatives.



Appendix A
Optional Formats

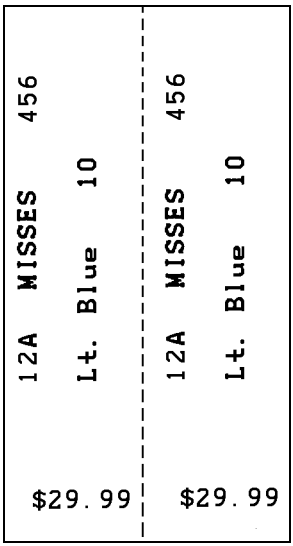
Some printers have 16 optional formats, in addition to the three standard formats. This appendix describes these formats.

Printers with optional formats have either Format Set A or Format Set B, but not both. Sets A and B are shown in this appendix.

Format Set A

Format Name: FMT 70
Number: 70
Dimensions (h x w):

Metric	69.8 x 38.1 mm
English	2.75 x 1.5 in
Dots	528 x 288 dots



Format Name: FMT 71
Number: 71
Dimensions (h x w):

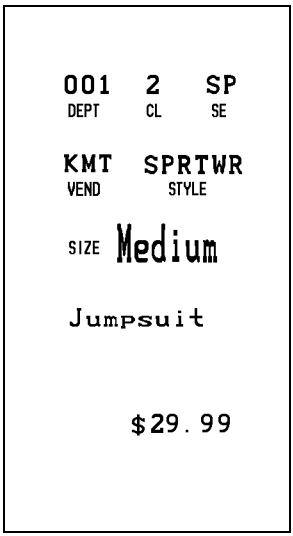
Metric	68.6 x 38.1 mm
English	2.7 x 1.5 in
Dots	519 x 288 dots

Format Name: FMT 72
Number: 72
Dimensions (h x w):

Metric	68.6 x 30.4 mm
English	2.7 x 1.2 in
Dots	519 x 230 dots

Format Name: FMT 73
Number: 73
Dimensions (h x w):

Metric	69.8 x 38.3 mm
English	2.75 x 1.5 in
Dots	528 x 288 dots

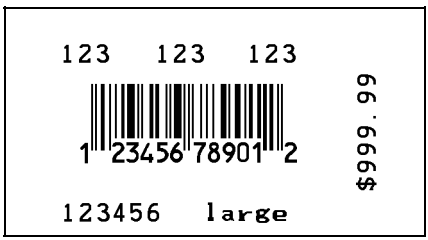


Format Name: FMT 74
Number: 74
Dimensions (h x w):

Metric	30.5 x 55.9 mm
English	1.2 x 2.2 in
Dots	231 x 423 dots

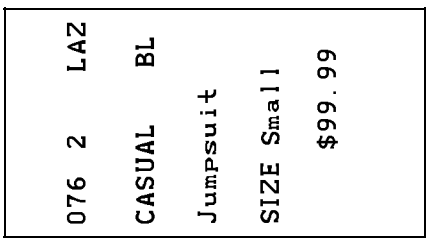
Format Name: FMT 75
Number: 75
Dimensions (h x w):

Metric	30.5 x 55.9 mm
English	1.2 x 2.2 in
Dots	231 x 423 dots



Format Name: FMT 76
Number: 76
Dimensions (h x w):

Metric	30.5 x 55.9 mm
English	1.2 x 2.2 in
Dots	231 x 423 dots

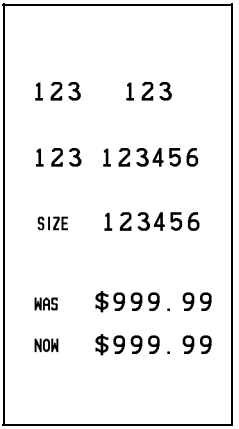


Format Name: FMT 77
Number: 77
Dimensions (h x w):

Metric	55.9 x 30.5 mm
English	2.2 x 1.2 in
Dots	423 x 231 dots

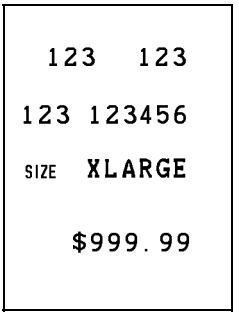
Format Name: FMT 78
Number: 78
Dimensions (h x w):

Metric	55.9 x 30.5 mm
English	2.2 x 1.2 in
Dots	423 x 231 dots



Format Name: FMT 79
Number: 79
Dimensions (h x w):

Metric	40.6 x 30.5 mm
English	1.6 x 1.2 in
Dots	307 x 231 dots



Format Name: FMT 80
Number: 80
Dimensions (h x w):

Metric	40.6 x 30.5 mm
English	1.6 x 1.2 in
Dots	307 x 231 dots

Format Name: FMT 81
Number: 81
Dimensions (h x w):

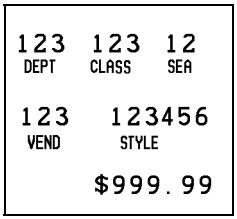
Metric	28.0 x 30.5 mm
English	1.1 x 1.2 in
Dots	211 x 231 dots

Format Name: FMT 82
Number: 82
Dimensions (h x w):

Metric	28.0 x 30.5 mm
English	1.1 x 1.2 in
Dots	211 x 231 dots

Format Name: FMT 83
Number: 83
Dimensions (h x w):

Metric	28.0 x 30.5 mm
English	1.1 x 1.2 in
Dots	211 x 231 dots

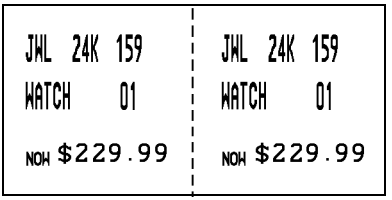


Format Name: FMT 84
Number: 84
Dimensions (h x w):

Metric	28.0 x 38.1 mm
English	1.1 x 1.5 in
Dots	211 x 288 dots

Format Name: FMT 85
Number: 85
Dimensions (h x w):

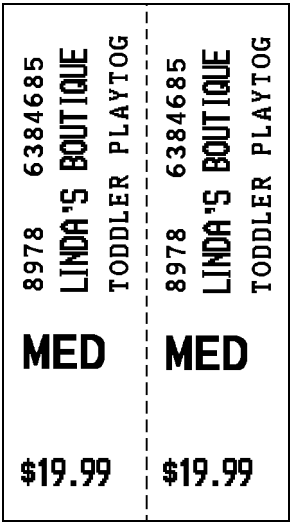
Metric	25.4 x 50.8 mm
English	1 x 2 in
Dots	192 x 384 dots



Format Set B

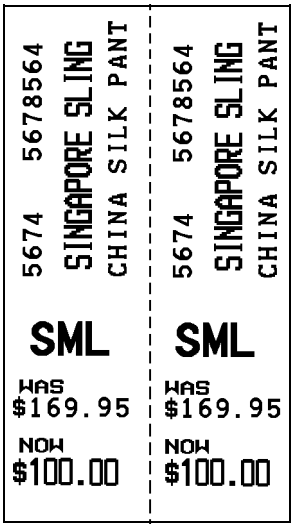
Format Name: FMT 54
Number: 54
Dimensions (h x w):

Metric	68.6 x 38.1 mm
English	2.7 x 1.5 in
Dots	519 x 288 dots



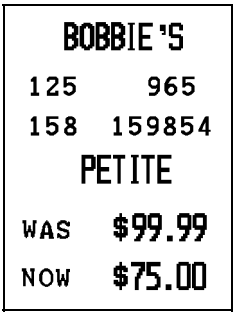
Format Name: FMT 55
Number: 55
Dimensions (h x w):

Metric 68.6 x 38.1 mm
English 2.7 x 1.5 in
Dots 519 x 288 dots



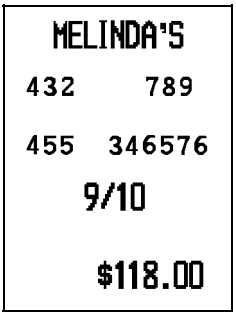
Format Name: FMT 56
Number: 56
Dimensions (h x w):

Metric 40.6 x 30.5 mm
English 1.6 x 1.2 in
Dots 308 x 231 dots



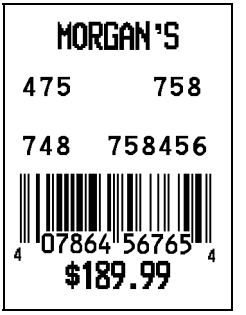
Format Name: FMT 57
Number: 57
Dimensions (h x w):

Metric 40.6 x 30.5 mm
English 1.6 x 1.2 in
Dots 308 x 231 dots



Format Name: FMT 58
Number: 58
Dimensions (h x w):

Metric	40.6 x 30.5 mm
English	1.6 x 1.2 in
Dots	308 x 231 dots

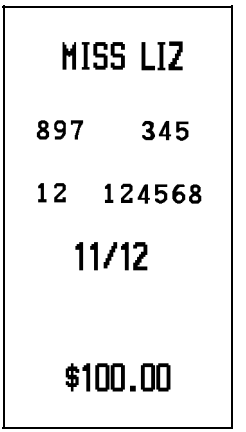


Format Name: FMT 59
Number: 59
Dimensions (h x w):

Metric	55.9 x 30.5 mm
English	2.2 x 1.2 in
Dots	423 x 231 dots

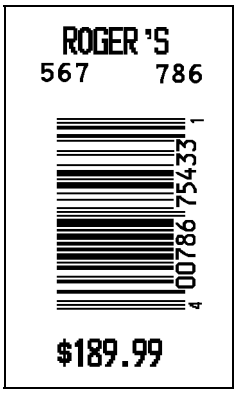
Format Name: FMT 60
Number: 60
Dimensions (h x w):

Metric	55.9 x 30.5 mm
English	2.2 x 1.2 in
Dots	423 x 231 dots



Format Name: FMT 61
Number: 61
Dimensions (h x w):

Metric	30.5 x 55.9 mm
English	1.2 x 2.2 in
Dots	231 x 423 dots

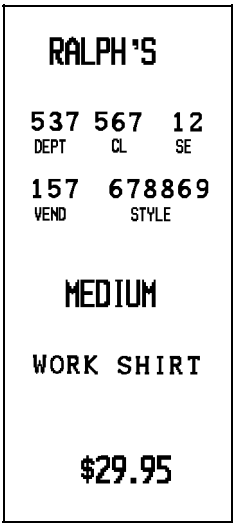


Format Name: FMT 62
Number: 62
Dimensions (h x w):

Metric	69.9 x 30.5 mm
English	2.75 x 1.2 in
Dots	528 x 231 dots

Format Name: FMT 63
Number: 63
Dimensions (h x w):

Metric	69.9 x 30.5 mm
English	2.75 x 1.2 in
Dots	528 x 231 dots



Format Name: FMT 64
Number: 64
Dimensions (h x w):

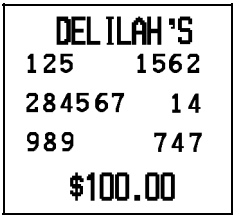
Metric	68.6 x 30.5 mm
English	2.7 x 1.2 in
Dots	519 x 231 dots

Format Name: FMT 65
Number: 65
Dimensions (h x w):

Metric 25.4 x 20.3 mm
English 1.0 x 0.8 in
Dots 192 x 154 dots

Format Name: FMT 66
Number: 66
Dimensions (h x w):

Metric 27.9 x 30.5 mm
English 1.1 x 1.2 in
Dots 212 x 231 dots



Format Name: FMT 67
Number: 67
Dimensions (h x w):

Metric 27.9 x 30.5 mm
English 1.1 x 1.2 in
Dots 212 x 231 dots

Format Name: FMT 68
Number: 68
Dimensions (h x w):

Metric 27.9 x 30.5 mm
English 1.1 x 1.2 in
Dots 212 x 231 dots

Format Name: FMT 69
Number: 69
Dimensions (h x w):

Metric	27.9 x 30.5 mm
English	1.1 x 1.2 in
Dots	212 x 231 dots

Appendix B
Data Stream Examples

This appendix lists the data streams for the three standard formats, and the optional formats shown in Appendix A.

Use these data streams as examples when you create your own data streams.

Standard Formats

Format Name: FMT-1
Format Number: 96

```
{
F,96,A,R,E,138,200,"FMT-1" ¦
T,1,18,V,094,008,0,1,1,1,B,L,0,0 ¦
R,20,"Line1:" ¦
B,2,12,F,039,037,1,2,043,4,L,0 ¦
R,20,"UPCA Barcode:" ¦
R,2,1 ¦
T,3,18,V,008,008,0,1,1,1,B,L,0,0 ¦
R,20,"Line2:" ¦
}
```

Dimensions (h x w):

Metric	35 x 50.8
English	1.38 x 2.0
Dots	265 x 384

Sample Batch Data Stream

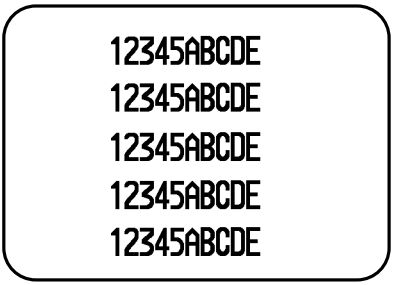
```
{
B,96,N,10 ¦
1,"ABC123DEF456GHI789" ¦
2,"12345678901"  ¦
3,"ABC123DEF456GHI789" ¦
}
```

Format Name: FMT-2
Format Number: 97

```
{
F,97,A,R,E,138,200,"FMT-2" ¦
T,1,10,V,108,050,0,2,2,2,B,L,0,0 ¦
R,20,"Line1:" ¦
T,2,10,V,083,050,0,2,2,2,B,L,0,0 ¦
R,20,"Line2:" ¦
T,3,10,V,057,050,0,2,2,2,B,L,0,0 ¦
R,20,"Line3:" ¦
T,4,10,V,031,050,0,2,2,2,B,L,0,0 ¦
R,20,"Line4:" ¦
T,5,10,V,006,050,0,2,2,2,B,L,0,0 ¦
R,20,"Line5:" ¦
}
```

Sample Batch Data Stream

```
{
B,97,N,10 ¦
1,"12345ABCDE" ¦
2,"12345ABCDE" ¦
3,"12345ABCDE" ¦
4,"12345ABCDE" ¦
5,"12345ABCDE" ¦
}
```



Dimensions (h x w):

Metric	35 x 50.8
English	1.38 x 2.0
Dots	265 x 384

Format Name: FMT-3
Format Number: 98

```
{
F,98,A,R,E,264,150,"FMT-3" ¦
T,1,5,V,240,012,0,2,1,1,B,L,0,0 ¦
R,20,"Number:" ¦
R,2,1 ¦
T,2,10,V,240,047,0,1,1,1,B,L,0,0 ¦
R,20,"Color:" ¦
B,3,12,F,114,012,1,4,100,4,L,0 ¦
R,20,"UPCA Barcode:" ¦
R,2,1 ¦
C,067,012,0,1,1,1,B,L,0,0,"Size:" ¦
T,4,8,V,066,047,0,1,2,1,B,R,0,0 ¦
R,20,"Size:" ¦
C,051,012,0,2,1,1,B,L,0,0,"Retail" ¦
C,043,012,0,2,1,1,B,L,0,0,"Price" ¦
C,028,012,0,2,1,1,B,L,0,0,"Our" ¦
C,020,012,0,2,1,1,B,L,0,0,"Price" ¦
T,5,8,V,043,047,0,1,1,1,B,R,0,0 ¦
R,42,1 ¦
R,20,"Retail Price:" ¦
T,6,8,V,020,047,0,1,1,1,B,R,0,0 ¦
R,42,1 ¦
R,20,"Our Price:" ¦
}
```

Dimensions (h x w):

Metric	67 x 38.1
English	2.64 x 1.5
Dots	507 x 288

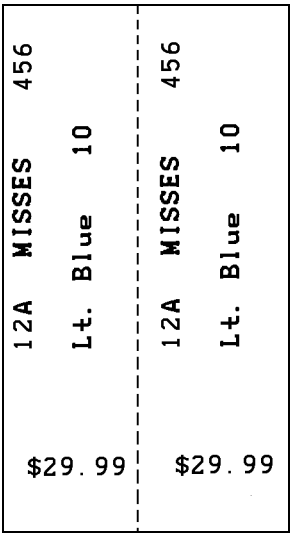
Sample Batch Data Stream

```
{
B,98,N,10 ¦
1,"12345" ¦
2,"ABCDEFGHIJ" ¦
3,"12345678901" ¦
4,"12AB34CD" ¦
5,"123456" ¦
6,"123456" ¦
}
```

Optional Format Set A

Format Name: FMT 70
Format Number: 70

```
{
F,70,A,R,M,0956,0381,"Fmt 70" ¦
T,001,03,V,0178,0046,0,1,1,1,B,L,0,1 ¦
R,20,"Class" ¦
T,002,06,V,0300,0046,0,1,1,1,B,L,0,1 ¦
R,20,"Style" ¦
T,003,03,V,0520,0046,0,1,1,1,B,L,0,1 ¦
R,20,"Vendor" ¦
T,004,08,V,0178,0124,0,1,1,1,B,L,0,1 ¦
R,20,"Color" ¦
T,005,06,V,0431,0124,0,1,1,1,B,L,0,1 ¦
R,20,"Size" ¦
T,006,07,V,0008,0008,0,1,1,1,B,L,0,0 ¦
R,20,"Price" ¦
R,42,1 ¦
T,007,03,V,0178,0243,0,1,1,1,B,L,0,1 ¦
R,4,1,1,3,1,2 ¦
R,5,N ¦
T,008,06,V,0300,0243,0,1,1,1,B,L,0,1 ¦
R,4,2,1,6,1,2 ¦
R,5,N ¦
T,009,03,V,0520,0243,0,1,1,1,B,L,0,1 ¦
R,4,3,1,3,1,2 ¦
R,5,N ¦
T,010,08,V,0178,0313,0,1,1,1,B,L,0,1 ¦
R,4,4,1,8,1,2 ¦
R,5,N ¦
T,011,06,V,0431,0313,0,1,1,1,B,L,0,1 ¦
R,4,5,1,6,1,2 ¦
R,5,N ¦
T,012,07,V,0008,0193,0,1,1,1,B,L,0,0 ¦
R,4,6,1,7,1,1 ¦
R,5,N ¦
}
```



Sample Batch Data Stream

```
{
B,70,N,3 ¦
1,"12A" ¦
2,"MISSES" ¦
3,"456" ¦
4,"Lt. Blue" ¦
5,"10" ¦
6,"2999" ¦
7,"" ¦
8,"" ¦
9,"" ¦
10,"" ¦
11,"" ¦
12,"" ¦
}
```

Format Name: FMT 71
Format Number: 71

```
{
F,71,A,R,M,0686,0381,"Fmt 71" ¦
C,0513,0050,0,2,1,1,B,L,0,0,"DEPT" ¦
C,0513,0172,0,2,1,1,B,L,0,0,"CL" ¦
C,0513,0266,0,2,1,1,B,L,0,0,"VEND" ¦
C,0409,0088,0,2,1,1,B,L,0,0,"STYLE" ¦
C,0409,0226,0,2,1,1,B,L,0,0,"SE" ¦
C,0333,0050,0,2,1,1,B,L,0,0,"SIZE" ¦
T,001,03,V,0541,0048,0,1,1,1,B,C,0,0 ¦
R,20,"Dept" ¦
T,002,03,V,0541,0155,0,1,1,1,B,C,0,0 ¦
R,20,"Class" ¦
T,003,03,V,0541,0263,0,1,1,1,B,C,0,0 ¦
R,20,"Vendor" ¦
T,004,06,V,0437,050,0,1,1,1,B,C,0,0 ¦
R,20,"Style" ¦
T,005,02,V,0437,0217,0,1,1,1,B,C,0,0 ¦
R,20,"Season" ¦
T,006,06,V,0330,0140,0,1,1,1,B,C,0,0 ¦
R,20,"Size" ¦
B,007,11,F,0218,0050,1,0,0076,7,L,0 ¦
R,20,"Barcode" ¦
T,008,07,V,0097,0174,0,1,1,1,B,L,0,0 ¦
R,20,"Price" ¦
R,42,1 ¦
}
```

Sample Batch Data Stream

```
{
B,71,N,3 ¦
1,"123" ¦
2,"ABC" ¦
3,"951" ¦
4,"INFANT" ¦
5,"05" ¦
6,"24 MOS" ¦
7,"40012345678" ¦
8,"1299" ¦
}
```

Format Name: FMT 72
Format Number: 72

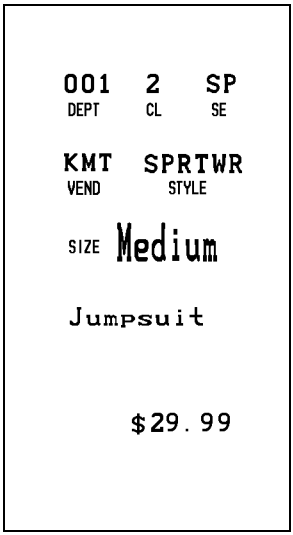
```
{
F,72,A,R,M,0686,0304,"Fmt 72" ¦
C,0513,0035,0,2,1,1,B,L,0,0,"DEPT" ¦
C,0513,0137,0,2,1,1,B,L,0,0,"CL" ¦
C,0513,0222,0,2,1,1,B,L,0,0,"SE" ¦
C,0409,0035,0,2,1,1,B,L,0,0,"VEND" ¦
C,0409,0163,0,2,1,1,B,L,0,0,"STYLE" ¦
C,0333,0035,0,2,1,1,B,L,0,0,"SIZE" ¦
T,1,3,V,0541,0030,0,1,1,1,B,C,0,0 ¦
R,20,"Dept" ¦
T,2,3,V,0541,0115,0,1,1,1,B,C,0,0 ¦
R,20,"Class" ¦
T,3,2,V,0541,0215,0,1,1,1,B,C,0,0 ¦
R,20,"Season" ¦
T,4,3,V,0437,0030,0,1,1,1,B,C,0,0 ¦
R,20,"Vendor" ¦
T,5,6,V,0437,0135,0,1,1,1,B,C,0,0 ¦
R,20,"Style" ¦
T,6,6,V,0328,0127,0,1,1,1,B,L,0,0 ¦
R,20,"Size" ¦
B,7,11,F,0216,0015,1,0,0076,8,L,0 ¦
R,20,"Barcode" ¦
T,8,7,V,0097,0095,0,1,1,1,B,L,0,0 ¦
R,20,"Price" ¦
R,42,1 ¦
}
```

Sample Batch Data Stream

```
{
B,72,N,2 ¦
1,"123" ¦
2,"123" ¦
3,"12" ¦
4,"123" ¦
5,"123456" ¦
6,"123456" ¦
7,"12345678901" ¦
8,"99999" ¦
}
```

Format Name: FMT 73
Format Number: 73

```
{
F,73,A,R,M,0698,0383,"Fmt 73" ¦
C,0513,0035,0,2,1,1,B,L,0,0,"DEPT" ¦
C,0513,0137,0,2,1,1,B,L,0,0,"CL" ¦
C,0513,0222,0,2,1,1,B,L,0,0,"SE" ¦
C,0409,0035,0,2,1,1,B,L,0,0,"VEND" ¦
C,0409,0163,0,2,1,1,B,L,0,0,"STYLE" ¦
C,0333,0035,0,2,1,1,B,L,0,0,"SIZE" ¦
T,1,03,V,0541,0030,0,1,1,1,B,C,0,0 ¦
R,20,"Dept" ¦
T,2,03,V,0541,0115,0,1,1,1,B,C,0,0 ¦
R,20,"Class" ¦
T,3,02,V,0541,0215,0,1,1,1,B,C,0,0 ¦
R,20,"Season" ¦
T,4,03,V,0437,0030,0,1,1,1,B,C,0,0 ¦
R,20,"Vendor" ¦
T,5,06,V,0437,0135,0,1,1,1,B,C,0,0 ¦
R,20,"Style" ¦
T,6,06,V,0318,0107,0,1,2,1,B,L,0,0 ¦
R,20,"Size" ¦
T,7,10,V,0236,0033,0,1,1,1,B,L,0,0 ¦
R,20,"Description" ¦
T,8,07,V,0097,0095,0,1,1,1,B,L,0,0 ¦
R,20,"Price" ¦
R,42,1 ¦
}
```



Sample Batch Data Stream

```
{
B,73,N,3 ¦
1,"001" ¦
2,"2" ¦
3,"SP" ¦
4,"KMT" ¦
5,"SPRTWR" ¦
6,"Medium" ¦
7,"Jumpsuit" ¦
8,"2999" ¦
}
```

Format Name: FMT 74
Format Number: 74

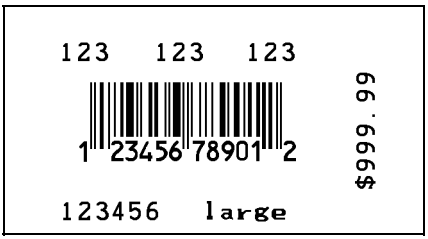
```
{
F,74,A,R,M,0305,0559,"Fmt 74" ¦
T,001,03,V,0275,0437,0,1,1,1,B,L,0,3 ¦
R,20,"Dept" ¦
T,002,03,V,0200,0437,0,1,1,1,B,L,0,3 ¦
R,20,"Class" ¦
T,003,03,V,0100,0437,0,1,1,1,B,L,0,3 ¦
R,20,"Vendor" ¦
T,004,06,V,0259,0373,0,1,1,1,B,L,0,3 ¦
R,20,"Style" ¦
T,005,02,V,0089,0373,0,1,1,1,B,L,0,3 ¦
R,20,"Color" ¦
B,006,11,F,0233,0355,1,0,190,7,L,2 ¦
R,20,"Barcode" ¦
T,007,07,V,0200,0030,0,1,1,1,B,L,0,3 ¦
R,20,"Price" ¦
R,42,1 ¦
}
```

Sample Batch Data Stream

```
{
B,74,N,3 ¦
1,"123" ¦
2,"123" ¦
3,"123" ¦
4,"123456" ¦
5,"12" ¦
6,"40000123456" ¦
7,"99999" ¦
}
```

Format Name: FMT 75
Format Number: 75

```
{
F,75,A,R,M,0305,0559,"Fmt 75" ¦
T,001,03,V,048,0470,0,1,1,1,B,L,0,2 ¦
R,20,"Dept" ¦
T,002,03,V,048,0325,0,1,1,1,B,L,0,2 ¦
R,20,"Class" ¦
T,003,03,V,048,0180,0,1,1,1,B,L,0,2 ¦
R,20,"Vendor" ¦
B,004,11,F,0163,0423,1,0,0076,7,L,2 ¦
R,20,"Barcode" ¦
T,005,06,V,0252,0447,0,1,1,1,B,L,0,2 ¦
R,20,"Style" ¦
T,006,06,V,0252,0264,0,1,1,1,B,L,0,2 ¦
R,20,"Size" ¦
T,007,07,V,0221,0020,0,1,1,1,B,C,0,3 ¦
R,20,"Price" ¦
R,42,1 ¦
}
```

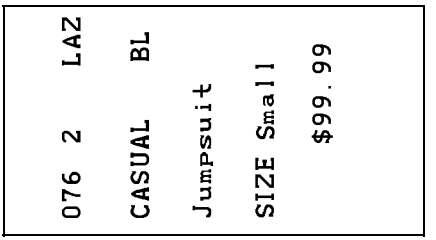


Sample Batch Data Stream

```
{
B,75,N,3 ¦
1,"123" ¦
2,"123" ¦
3,"123" ¦
4,"12345678910" ¦
5,"123456" ¦
6,"Large" ¦
7,"99999" ¦
}
```

Format Name: FMT 76
Format Number: 76

```
{
F,76,A,R,M,0305,0559,"Fmt 76" ¦
C,0280,0175,0,1,1,1,B,L,0,3,"SIZE" ¦
T,001,03,V,0275,0427,0,1,1,1,B,L,0,3 ¦
R,20,"Dept" ¦
T,002,03,V,0175,0427,0,1,1,1,B,L,0,3 ¦
R,20,"Class" ¦
T,003,03,V,0075,0427,0,1,1,1,B,L,0,3 ¦
R,20,"Vendor" ¦
T,004,06,V,0259,0338,0,1,1,1,B,L,0,3 ¦
R,20,"Style" ¦
T,005,02,V,0069,0338,0,1,1,1,B,L,0,3 ¦
R,20,"Color" ¦
T,006,10,V,0000,0257,0,1,1,1,B,L,0,3 ¦
R,20,"Description" ¦
T,007,06,V,0175,0175,0,1,1,1,B,L,0,3 ¦
R,20,"Size" ¦
T,008,07,V,0200,0101,0,1,1,1,B,L,0,3 ¦
R,20,"Price" ¦
R,42,1 ¦
}
```



Sample Batch Data Stream

```
{
B,76,N,3 ¦
1,"076" ¦
2,"2" ¦
3,"LAZ" ¦
4,"CASUAL" ¦
5,"BL" ¦
6,"Jumpsuit" ¦
7,"Small" ¦
8,"9999" ¦
}
```

Format Name: FMT 77
Format Number: 77

```
{
F,77,A,R,M,0559,0305,"Fmt 77" ¦
T,001,03,V,0401,0035,0,1,1,1,B,L,0,0 ¦
R,20,"Dept" ¦
T,002,03,V,0401,0185,0,1,1,1,B,L,0,0 ¦
R,20,"Class" ¦
T,003,03,V,0325,0035,0,1,1,1,B,L,0,0 ¦
R,20,"Vendor" ¦
T,004,06,V,0325,0142,0,1,1,1,B,L,0,0 ¦
R,20,"Style" ¦
B,005,11,F,0216,0018,1,0,063,1,L,0 ¦
R,20,"Barcode" ¦
T,006,1,F,0178,0020,0,2,1,1,B,L,0,0 ¦
R,4,005,1,1,1,1 ¦
R,5,N ¦
T,007,1,F,0178,0250,0,2,1,1,B,L,0,0 ¦
R,4,005,12,1,1,1 ¦
R,5,N ¦
T,008,07,V,0120,0112,0,1,1,1,B,L,0,0 ¦
R,20,"Price" ¦
R,42,1 ¦
}
```

Sample Batch Data Stream

```
{
B,77,N,3 ¦
1,"123" ¦
2,"123" ¦
3,"123" ¦
4,"123456" ¦
5,"01234567890" ¦
6,"" ¦
7,"" ¦
8,"99999" ¦
}
```

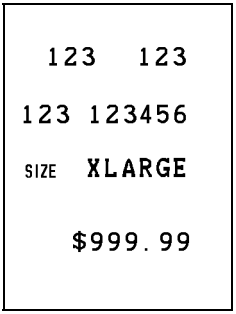
Format Name: FMT 78
Format Number: 78

```
{
F,78,A,R,M,0559,0305,"Fmt 78" ¦
C,0236,0038,0,2,1,1,B,L,0,0,"SIZE" ¦
C,0132,0038,0,2,1,1,B,L,0,0,"WAS" ¦
C,0078,0038,0,2,1,1,B,L,0,0,"NOW" ¦
T,001,03,V,0401,0038,0,1,1,1,B,L,0,0 ¦
R,20,"Dept" ¦
T,002,03,V,0401,0175,0,1,1,1,B,L,0,0 ¦
R,20,"Class" ¦
T,003,03,V,0317,0038,0,1,1,1,B,L,0,0 ¦
R,20,"Vendor" ¦
T,004,06,V,0317,0125,0,1,1,1,B,L,0,0 ¦
R,20,"Style" ¦
T,005,06,V,0233,0125,0,1,1,1,B,L,0,0 ¦
R,20,"Size" ¦
T,006,07,V,0129,0116,0,1,1,1,B,L,0,0 ¦
R,20,"Was Price" ¦
R,42,1 ¦
T,007,07,V,0075,0114,0,1,1,1,B,L,0,0 ¦
R,20,"Now Price" ¦
R,42,1 ¦
}
```

Sample Batch Data Stream

```
{
B,78,N,3 ¦
1,"123" ¦
2,"123" ¦
3,"123" ¦
4,"123456" ¦
5,"123456" ¦
6,"99999" ¦
7,"99999" ¦
}
```

Format Name: FMT 79
Format Number: 79




```
{
F,79,A,R,M,0406,0305,"Fmt 79" ¦
C,0128,0020,0,2,1,1,B,L,0,0,"SIZE" ¦
T,001,03,V,0275,0020,0,1,1,1,B,L,0,0 ¦
R,20,"Dept" ¦
T,002,03,V,0275,0175,0,1,1,1,B,L,0,0 ¦
R,20,"Class" ¦
T,003,03,V,0199,0020,0,1,1,1,B,L,0,0 ¦
R,20,"Vendor" ¦
T,004,06,V,0199,0130,0,1,1,1,B,L,0,0 ¦
R,20,"Style" ¦
T,005,06,V,0128,0130,0,1,1,1,B,L,0,0 ¦
R,20,"Size" ¦
T,006,07,V,0034,0112,0,1,1,1,B,L,0,0 ¦
R,20,"Price" ¦
R,42,1 ¦
}
```

Sample Batch Data Stream

```
{
B,79,N,3 ¦
1,"123" ¦
2,"123" ¦
3,"123" ¦
4,"123456" ¦
5,"XLARGE" ¦
6,"99999" ¦
}
```

Format Name: FMT 80
Format Number: 80

```
{
F,80,A,R,M,0406,0305,"Fmt 80" ¦
T,001,03,V,0291,0020,0,1,1,1,B,L,0,0 ¦
R,20,"Dept" ¦
T,002,03,V,0291,0190,0,1,1,1,B,L,0,0 ¦
R,20,"Class" ¦
T,003,03,V,0232,0020,0,1,1,1,B,L,0,0 ¦
R,20,"Vendor" ¦
T,004,06,V,0232,0132,0,1,1,1,B,L,0,0 ¦
R,20,"Style" ¦
B,005,11,F,0122,0010,1,0,78,1,L,0 ¦
R,20,"Barcode" ¦
T,006,1,F,082,010,0,2,1,1,B,L,0,0 ¦
R,4,005,1,1,1,1 ¦
R,5,N ¦
T,007,1,F,082,0240,0,2,1,1,B,L,0,0 ¦
R,4,005,12,1,1,1 ¦
R,5,N ¦
T,008,07,V,0042,0120,0,1,1,1,B,L,0,0 ¦
R,20,"Price" ¦
R,42,1 ¦
}
```

Sample Batch Data Stream

```
{
B,80,N,3 ¦
1,"111" ¦
2,"222" ¦
3,"333" ¦
4,"444444" ¦
5,"55555555555" ¦
6,"" ¦
7,"" ¦
8,"99999" ¦
}
```

Format Name: FMT 81
Format Number: 81

```
{
F,81,A,R,M,0280,0305,"Fmt 81" ¦
B,001,11,F,0120,0020,1,0,0076,8,L,0 ¦
R,20,"Barcode" ¦
T,002,03,V,0064,0027,0,1,1,1,B,L,0,0 ¦
R,20,"Dept" ¦
T,003,06,V,0064,0136,0,1,1,1,B,L,0,0 ¦
R,20,"Style" ¦
T,004,07,V,0018,0086,0,1,1,1,B,L,0,0 ¦
R,20,"Price" ¦
R,42,1 ¦
}
```

Sample Batch Data Stream

```
{
B,81,N,3 ¦
1,"11111111111" ¦
2,"222" ¦
3,"333333" ¦
4,"99999" ¦
}
```

Format Name: FMT 82
Format Number: 82

```
{
F,82,A,R,M,0280,0305,"Fmt 82" ¦
C,0080,0025,0,2,1,1,B,L,0,0,"REG. PRICE" ¦
C,0027,0025,0,2,1,1,B,L,0,0,"SALE PRICE" ¦
B,001,11,F,0140,0017,1,0,0076,8,L,0 ¦
R,20,"Barcode" ¦
T,002,07,V,0079,0135,0,1,1,1,B,L,0,0 ¦
R,20,"Reg. Price" ¦
R,42,1 ¦
T,003,07,V,0026,0135,0,1,1,1,B,L,0,0 ¦
R,20,"Sale Price" ¦
R,42,1 ¦
}
```

Sample Batch Data Stream

```
{
B,82,N,3 ¦
1,"12345678901" ¦
2,"99999" ¦
3,"99999" ¦
}
```

Format Name: FMT 83
Format Number: 83

```
{
F,83,A,R,M,0280,0305,"Fmt 83" ¦
C,0188,0030,0,2,1,1,B,L,0,0,"DEPT" ¦
C,0188,0116,0,2,1,1,B,L,0,0,"CLASS" ¦
C,0188,0218,0,2,1,1,B,L,0,0,"SEA" ¦
C,0086,0157,0,2,1,1,B,L,0,0,"STYLE" ¦
C,0089,0033,0,2,1,1,B,L,0,0,"VEND" ¦
T,001,03,V,0213,0022,0,1,1,1,B,C,0,0 ¦
R,20,"Dept" ¦
T,002,03,V,0213,0119,0,1,1,1,B,C,0,0 ¦
R,20,"Class" ¦
T,003,02,V,0213,0215,0,1,1,1,B,C,0,0 ¦
R,20,"Season" ¦
T,004,03,V,0117,0025,0,1,1,1,B,C,0,0 ¦
R,20,"Vendor" ¦
T,005,06,V,0117,0144,0,1,1,1,B,C,0,0 ¦
R,20,"Style" ¦
T,006,07,V,0028,0122,0,1,1,1,B,L,0,0 ¦
R,20,"Price" ¦
R,42,1 ¦
}
```

Sample Batch Data Stream

```
{
B,83,N,3 ¦
1,"123" ¦
2,"123" ¦
3,"12" ¦
4,"123" ¦
5,"123456" ¦
6,"99999" ¦
}
```

Format Name: FMT 84
Format Number: 84

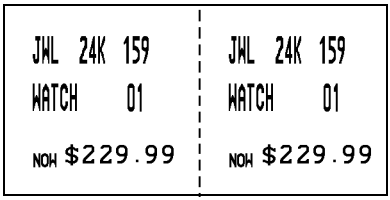
```
{
F,84,A,R,M,0280,0381,"Fmt 84" ¦
C,0173,0020,0,2,1,1,B,C,0,0,"DEPT" ¦
C,0173,0111,0,2,1,1,B,C,0,0,"CLASS" ¦
C,0173,0235,0,2,1,1,B,C,0,0,"STYLE" ¦
T,001,03,V,0198,0012,0,1,1,1,B,C,0,0 ¦
R,20,"Dept" ¦
T,002,03,V,0198,0111,0,1,1,1,B,C,0,0 ¦
R,20,"Class" ¦
T,003,06,V,0198,0202,0,1,1,1,B,C,0,0 ¦
R,20,"Style" ¦
B,004,11,F,0087,0057,1,0,0076,7,L,0 ¦
R,20,"Barcode" ¦
T,005,07,V,0013,0111,0,1,1,1,B,C,0,0 ¦
R,20,"Price" ¦
R,42,1 ¦
}
```

Sample Batch Data Stream

```
{
B,84,N,3 ¦
1,"111" ¦
2,"222" ¦
3,"33333" ¦
4,"77777777777" ¦
5,"99999" ¦
}
```

Format Name: FMT 85
Format Number: 85

```
{
F,85,A,R,M,0254,0508,"Fmt 85" ¦
C,0018,0025,0,2,1,1,B,L,0,0,"NOW" ¦
T,001,03,V,0155,0025,2,2,2,1,B,L,0,0 ¦
R,20,"Dept" ¦
T,002,03,V,0155,0085,2,2,2,1,B,L,0,0 ¦
R,20,"Class" ¦
T,003,03,V,0155,0142,2,2,2,1,B,L,0,0 ¦
R,20,"Vendor" ¦
T,004,06,V,0092,0025,2,2,2,1,B,L,0,0 ¦
R,20,"Style" ¦
T,005,02,V,0092,0148,2,2,2,1,B,L,0,0 ¦
R,20,"Season" ¦
T,006,07,V,0018,0070,0,1,1,1,B,L,0,0 ¦
R,20,"Price" ¦
R,42,1 ¦
C,0018,0279,0,2,1,1,B,L,0,0,"NOW" ¦
T,007,03,V,0155,0279,2,2,2,1,B,L,0,0 ¦
R,4,1,1,3,1,2 ¦
R,5,N ¦
T,008,03,V,0155,0339,2,2,2,1,B,L,0,0 ¦
R,4,2,1,3,1,2 ¦
R,5,N ¦
T,009,03,V,0155,0396,2,2,2,1,B,L,0,0 ¦
R,4,3,1,3,1,2 ¦
R,5,N ¦
T,010,06,V,0092,0279,2,2,2,1,B,L,0,0 ¦
R,4,4,1,6,1,2 ¦
R,5,N ¦
T,011,02,V,0092,0402,2,2,2,1,B,L,0,0 ¦
R,4,5,1,2,1,1 ¦
R,5,N ¦
T,012,07,V,0018,0324,0,1,1,1,B,L,0,0 ¦
R,4,6,1,7,1,1 ¦
R,5,N ¦
}
```



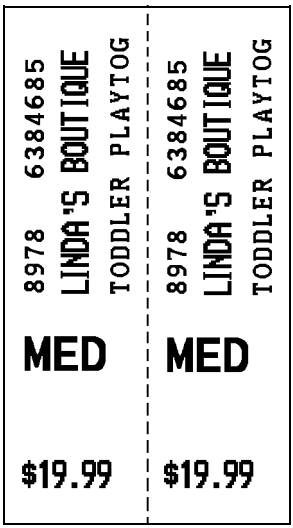
Sample Batch Data Stream

```
{
B,85,N,3 ¦
1,"JWL" ¦
2,"24K" ¦
3,"159" ¦
4,"WATCH" ¦
5,"01" ¦
6,"22999" ¦
7,"" ¦
8,"" ¦
9,"" ¦
10,"" ¦
11,"" ¦
12,"" ¦
}
```

Optional Format Set B

Format Name: FMT 54
Number: 54

```
{
F,54,A,R,E,0270,0150,"FMT 54" ¦
T,001,04,V,0110,0018,00,1,1,1,B,L,0,1 ¦
R,20,"CLASS:" ¦
T,002,07,V,0170,0018,0,1,1,1,B,L,0,1 ¦
R,20,"STYLE:" ¦
T,003,15,V,0110,0065,0,1,1,1,B,L,0,1 ¦
R,20,"DESCRIPTION:" ¦
T,004,04,V,0070,0005,00,003,01,01,B,C,0,0 ¦
R,20,"SIZE:" ¦
T,005,07,V,0010,0003,00,002,02,02,B,C,0,0 ¦
R,20,"PRICE:" ¦
R,42,1 ¦
T,006,16,V,0110,0040,00,002,02,02,B,C,0,1 ¦
R,20,"STORE NAME:" ¦
T,007,04,V,0110,0096,0,1,1,1,B,L,0,1 ¦
R,4,001,001,004,001,1 ¦
R,5,N ¦
T,008,07,V,0170,0096,00,001,01,01,B,L,0,1 ¦
R,4,002,001,007,001,1 ¦
R,5,N ¦
T,009,15,V,0110,0140,00,001,01,01,B,L,0,1 ¦
R,4,003,001,015,001,1 ¦
R,5,N ¦
T,010,04,V,0070,0080,00,003,01,01,B,C,0,0 ¦
R,4,004,001,004,001,1 ¦
R,5,N ¦
T,011,07,V,0010,0076,00,002,02,02,B,C,0,0 ¦
R,4,005,001,007,001,1 ¦
R,5,N ¦
T,012,16,V,0110,0118,00,002,02,02,B,C,0,1 ¦
R,4,006,001,016,001,1 ¦
R,5,N ¦
}
```



Sample Batch Data Stream

```
{B,54,N,1 ¦
1,"8978" ¦
2,"6384685" ¦
3,"TODDLER PLAYTOG" ¦
4,"MED" ¦
5,"1999" ¦
6,"LINDA'S BOUTIQUE"
¦
7,"" ¦
8,"" ¦
9,"" ¦
10,"" ¦
11,"" ¦
12,"" ¦
```

Appendix C
Printable Characters

You can use character codes to enter characters other than those shown in the font samples for Standard and Reduced fonts.

You can also use codes to enter function codes for Code 128 bar codes.

Entering Special Characters in Data Streams

When creating data streams for downloading, place the character code in the data stream by entering a tilde (~) followed by the 3-digit code.

For example, the character **é** is represented by ~130.

This appendix lists supported character codes and their corresponding characters.

Code 128 Function Codes

Online Code	Offline Code	Function Code
~201	Pause 201	F1
~202	Pause 202	F2
~203	Pause 203	F3
~204	Pause 203	F4

Function Codes For Special Characters

Char.	Online Code	Offline Code	Char.	Online Code	Offline Code
Ç	~128	Pause 128	Ö	~153	Pause 153
ü	~129	Pause 129	Ü	~154	Pause 154
é	~130	Pause 130	¢	~155	Pause 155
â	~131	Pause 131	L.	~156	Pause 156
ä	~132	Pause 132	¥	~157	Pause 157
à	~133	Pause 133	Pt	~158	Pause 158
å	~134	Pause 134	*f*	~159	Pause 159
ç	~135	Pause 135	á	~160	Pause 160
ê	~136	Pause 136	í	~161	Pause 161
ë	~137	Pause 137	ó	~162	Pause 162
è	~138	Pause 138	ú	~163	Pause 163
ï	~139	Pause 139	ñ	~164	Pause 164
î	~140	Pause 140	Ñ	~165	Pause 165
ì	~141	Pause 141	ª	~166	Pause 166
Ä	~142	Pause 142	º	~167	Pause 167
Å	~143	Pause 143	¿	~168	Pause 168
É	~144	Pause 144	⌐	~169	Pause 169
æ	~145	Pause 145	¬	~170	Pause 170
Æ	~146	Pause 146	½	~171	Pause 171
ô	~147	Pause 147	¼	~172	Pause 172
ö	~148	Pause 148	¡	~173	Pause 173
ò	~149	Pause 149	«	~174	Pause 174
û	~150	Pause 150	»	~175	Pause 175
ù	~151	Pause 151	Ø	~210	Pause 210
ÿ	~152	Pause 152	ø	~214	Pause 214
α	~224	Pause 224	ß	~225	Pause 225

Appendix D
Format Design Tools

Use these format design tools to create formats and keep a permanent record of format parameters. Make copies of these worksheets and work from the copies. This appendix contains these tools.

Format Worksheet

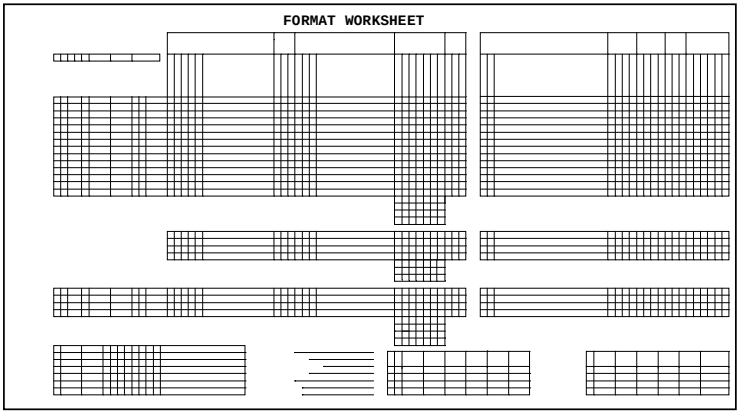
Sample Worksheet

Supply Layout Grids

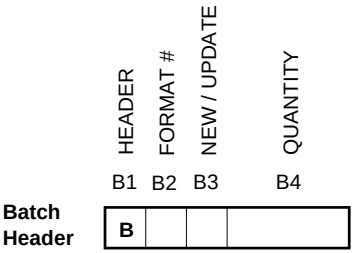
Batch Worksheet

Check Digit Worksheet

Data Entry Guide



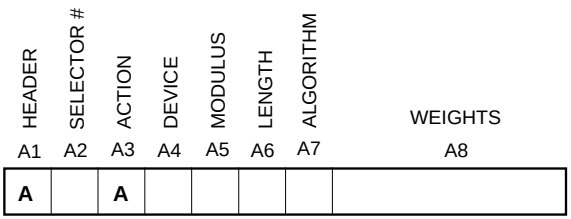
Batch Worksheet

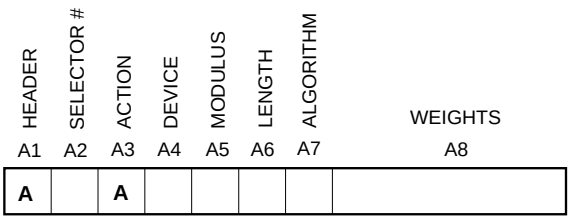


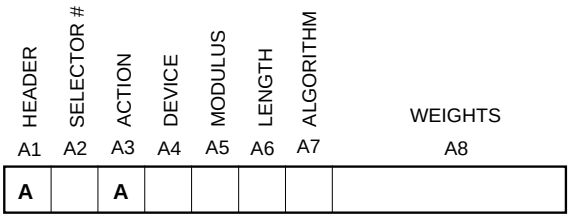
Batch Data

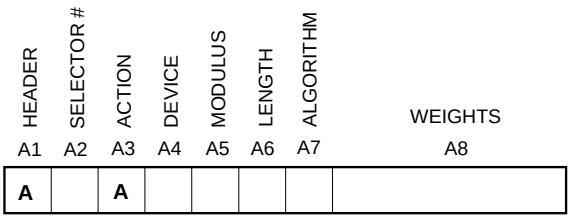
Field #	Data
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	

Check Digit Worksheet









Data Entry Guide

Use this sheet to print supplies using Format: SAMPLE.

The supply size is: 1.5" **w** x 1.5" **h.**

Follow the steps below to print supplies.

1. Turn on the printer. Press and hold [Esc] until you see Main Menu.

2. When you see each prompt below, follow the instruction to the right of the box.

3.	MAIN MENU < >	Press [←] or [→] until you see Batch Entry.
4.	MAIN MENU < Batch Entry >	Press [Enter].
5.	FORMAT TYPE < Standard	Press [←] or [→] until you see ONLINE, then press [Enter].
6.	SELECT FORMAT: format name	Press [←] or [→] until you see SAMPLE, then press [Enter].
7.	SELECT FORMAT: SAMPLE	PRESS ENTER
8.	UPCA?	TYPE 0123456790 AND PRESS ENTER
9.	DATE?	TYPE TODAYS DATE (MM/dd/yy) AND PRESS ENTER
10.	PRICE?	TYPE 1995 AND PRESS ENTER
11.		
12.		

13.

14.

15.

16.

17.

18.

19.

20.

21.

22.

23.

24.

25.

26.

Data Entry Guide

Use this sheet to print supplies using Format: _____.

The supply size is: _____**w** x _____**h.**

Follow the steps below to print supplies.

1. Turn on the printer. Press and hold Esc until you see Main Menu.

2. When you see each prompt below, follow the instruction to the right of the box.

3.	MAIN MENU < >	Press ← or → until you see Batch Entry.
4.	MAIN MENU < Batch Entry >	Press Enter.
5.	FORMAT TYPE < Standard	Press ← or → until you see _____, then press Enter.
6.	SELECT FORMAT: format name	Press ← or → until you see _____, then press Enter.
7.		
8.		
9.		
10.		
11.		
12.		

13.

14.

15.

16.

17.

18.

19.

20.

21.

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Published by Technical Communications Department.
Printed in the U.S.A.